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# STERILITY IN WOMEN

ARTHUR E. GILES

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# STERILITY IN WOMEN

PUBLISHED BY THE JOINT COMMITTEE OF
HENRY FROWDE AND HODDER & STOUGHTON
17, WARWICK SQUARE, LONDON, E.C. 4.

# STERILITY IN WOMEN

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SENIOR SURGEON TO THE CHELSEA HOSPITAL FOR WOMEN GYNAECOLOGIST TO THE PRINCE OF WALES'S GENERAL HOSPITAL, TOTTENHAM

*WITH ELEVEN ILLUSTRATIONS*

LONDON

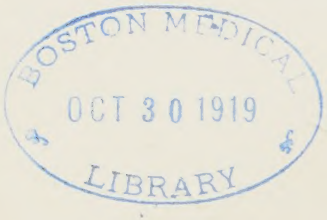
HENRY FROWDE
Oxford University Press

HODDER & STOUGHTON
Warwick Square, E.C.

1919

1751.6 Fol L 50

PRINTED IN GREAT BRITAIN BY
THE LONDON AND NORWICH PRESS LIMITED
LONDON AND NORWICH



# PREFACE

When the publishers did me the honour of requesting me to write a monograph on Sterility in Women, I acceded with pleasure for two reasons.

The first was a personal one, namely that I had been interested in the subject for a long time ; and, without proffering any claim to be regarded as a " specialist " therein, had a good deal of material available.

The second reason was based on considerations of public welfare. At any time the prevalence of sterility in a community is a serious menace to national prosperity and well-being, both by reason of the lowered standard of health of which sterility is the expression, and also because of the loss to the nation of the unborn children. At the present time the subject is of greatly increased importance. Hundreds of thousands of young and virile men who should have been the fathers of the next generation have laid down their lives to save Britain and the world from the ruin that would have befallen them if Germany's arrogant ambition had triumphed. The Victory of Right and Liberty has been won, but a part of the cost of that Victory can never be recovered in compensation and indemnities : that cost is expressed in the pathetic numbers of young widows and the countless thousands of young unmarried women condemned to " perpetual maidenhood."

It is evident that with the limitation of the number of marriages it is increasingly important that the marriages that are consummated should be fruitful. It is at least a step in the direction of this object

if one can expound the causes of sterility and point out the measures that are available to remedy deficiences and remove obstacles. Imbued as I was with these views the request to write this monograph came to me with something of the appeal of a public duty; particularly because no book on the subject has been brought out in this country for many years.

The diagnosis and treatment of the causes of sterility rest with my medical confrères; my object is to help them in their endeavours: and to them I must leave the verdict as to whether this book fulfils its purpose.

Arthur E. Giles.

10, Upper Wimpole Street,
London, W.

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# STERILITY IN WOMEN

## CHAPTER I

### Man's Share of Responsibility for Childless Marriages

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The begetting of a child involves three physiological processes :

First, ability on the man's part to deposit healthy seminal fluid in contact with the orifice of the womb of the woman.

Secondly, ability on the woman's part to receive this fluid at the orifice of the womb, and such a condition of health of the uterus, Fallopian tubes and ovaries as will enable the spermatozoa to meet and unite with a healthy ovum.

Thirdly, the setting up and carrying out of the changes in the womb that are necessary for the development of the fertilized ovum into the babe ripe for birth. Failure in either of the first two processes leads to unfruitful union, or sterility. Failure in the third process leads to miscarriage.

The subject to be considered in this book is Sterility in Women, and therefore we shall be concerned mainly with the second process, and with the various anatomical and functional defects therein that make a woman barren.

It is often necessary, however, before we can say that the woman is to blame, that we should be in a position to affirm that the fault does not lie with the man. We must therefore devote some preliminary observations to man's share in the responsibility

for childless marriages. We must, for this purpose, review the tests by means of which we can determine whether the man is able to do his part and accomplish the first physiological process above postulated. Lastly, in order that the validity of these tests may be established, we must state what is known about the normal process of insemination.

It is evident that to ensure a clear understanding of these three phases of the subject of man's responsibility, we must deal with them in their inverse order.

*The Normal Process of Insemination.*

Living and healthy spermatozoa exhibit a lively motility after their discharge, provide that they remain in a suitable medium. Acids and acid secretions kill them rapidly; extremes of heat and cold do the same. Normal saline solution at the temperature of the body preserves them alive indefinitely; weak alkaline solutions preserve and even excite motility.

The normal vaginal secretion is acid; and consequently spermatozoa that remain in the vagina beyond a certain time perish and are useless for the purpose of impregnation.

The normal uterine secretion is alkaline and tends to preserve the life of the spermatozoa.

In normal coitus the placing of the spermatozoa in this favourable medium is effected through the agency both of the man and of the woman; for in the case of the vigorous man the erect organ comes into contact with the cervix and the semen is ejected with some force against the normally placed external os; whilst the woman's part is this—that during the orgasm the os becomes slightly dilated, thus facilitating the entry of the semen, and, in addition, there is a discharge of an alkaline mucous secretion

from the cervix which protects the newly discharged spermatozoa from too early destruction by the vaginal secretion.

The elementary condition, therefore, of successful impregnation is that spermatozoa should be deposited at the entrance to or just within the cervical canal, for those that remain in the vagina perish, but those that enter the cervical canal have a chance of fulfilling their destiny.

Exceptions doubtless occur. Cases of pregnancy have been reported in which complete penetration of the vagina did not take place, and others in which the hymen was not even ruptured; but these exceptions do not invalidate the above description of what occurs normally. They may, indeed, be plausibly, and I think correctly, explained by the supposition that in these cases the acidity of the vaginal secretion was neutralized by an abundant discharge of the cervical secretion, such as undoubtedly occurs in some women. Kehrer (1)* states that during coitus so much alkaline semen is expelled as to neutralize the acidity of the vaginal secretion, but other authors regard this as exceptional.

Observations have been made in order to ascertain how long the spermatozoa remain alive in the vagina, cervix, and fundus of the uterus respectively.

*Spermatozoa in the Vagina.*

The earliest observations were those of Haussmann (2), who found that in 4 out of 5 cases examined 12 hours after coitus no live spermatozoa were found in the vagina. In 6 cases examined 15 hours after coitus masses of dead spermatozoa were found, but no live ones; and the reaction of the mucus was always acid. In one case he found live spermatozoa

*The figures in brackets refer to the references at the end of the chapters.

in the vagina 38 hours after coitus; but this was explained by the fact that menstruation came on 12 hours after coitus, and by the supposition that live spermatozoa from the inside of the uterus were expelled with the menstrual blood.

Hühner (3), of New York, who records these observations of Haussmann's, carried out much more extensive investigations on this subject, in 62 cases, with the following results:

One hour after coitus, live spermatozoa were found in the vagina in 2 cases out of 3.

Two hours after, dead spermatozoa were found in 4 cases, and none in 2 others.

Three hours after, live spermatozoa were found in one case, dead ones in 7 cases and none at all in 4.

In 28 cases examined from 4 to 20 hours after coitus, dead spermatozoa were found in some, none in others: but live spermatozoa were not once found.

In 13 cases examined from 1 to 5 days after coitus no spermatozoa were ever found.

In all the above cases a previous or subsequent examination showed that the husband had live spermatozoa.

*Spermatozoa in the Cervical Canal.*

Hühner gives the results of 152 observations made at periods varying from 1 hour to 6 days after coitus, which I have summarized in the following table:

| Spermatozoa found after | 1–12 hours. | | | 15–24 hours. | | | 2–5 days. | | |
|---|---|---|---|---|---|---|---|---|---|
| Live | 44 cases or | | 45·9% | 3 cases or | | 11·6% | 6 cases or | | 20·0% |
| Dead | 25 | ,, | 26·0% | 6 | ,, | 23·0% | 5 | ,, | 16·7% |
| None | 27 | ,, | 28·1% | 17 | ,, | 65·4% | 19 | ,, | 63·3% |
| Total | 96 | ,, | 100% | 26 | ,, | 100% | 30 | ,, | 100% |

Hühner points out that all these observations were made on sterile patients; and that one would not

expect to find live spermatozoa in the genital passages of women who are sterile as frequently as in women who are not.

*Spermatozoa in the Fundus of the Uterus.*

The investigation of this question is attended with some difficulties, especially that of being sure that the material examined is really derived from the fundus, without contamination from the vagina or cervix. It is not necessary to describe here the technique of the procedure; readers who are interested therein may be referred to Hühner's work. He records the results of 65 observations in which he claims that he could be certain that the specimen obtained actually came from the fundus and was not contaminated with cervical mucus.

I have summarized his results in the same way as in the case of the observations on the cervix, as follows:

| Spermatozoa found after | 1–12 hours. | | 15–24 hours. | | 2–7 days. | |
|---|---|---|---|---|---|---|
| Live | 10 cases | 27·0% | 2 cases | 16·7% | 1 case | 6·3% |
| Dead | 3 ,, | 8·1% | 2 ,, | 16·7% | 2 ,, | 12·5% |
| None | 24 ,, | 64·9% | 8 ,, | 66·6% | 13 ,, | 81·3% |
| Total | 37 ,, | 100% | 12 ,, | 100% | 16 ,, | 100% |

*Spermatozoa in the Fallopian Tubes.*

Hardly anything is known as to the time necessary for spermatozoa to reach the Fallopian tubes, or the length of time during which they can remain alive in that position. Hirschfeld, quoted by Bab (4) found spermatozoa in the tubes 14-16 hours after coitus, the examination being made post-mortem; and Bailey and Miller (5) state that in one case of removal of the tubes by operation live spermatozoa were found therein three and a half weeks after coitus.

The phenomenon of ovarian pregnancy demonstrates that it is possible for live spermatozoa to find their way to the surface of the ovary.

We may summarize the observations detailed above thus: Spermatozoa in the vagina die within one hour after coitus; in the cervical canal they may be found in many cases as long as 2 to 5 days after coitus; in the fundus they are frequently found within the first 24 hours after coitus, and occasionally after several days. Higher up, that is, in the Fallopian tubes, their normal behaviour is unknown.

Before leaving the subject of normal impregnation we may say a few words on the subject of *effluvium seminis*, by which term is described the flowing out of semen from the vagina after coitus.

It has been held that during normal coitus a pool of semen collects in the posterior vaginal fornix, which has on this account been called the *receptaculum seminis;* that the cervix for some time afterwards is bathed in this pool, and that the spermatozoa are drawn up thence into the cervical canal.

It is therefore inferred that in the case of effluvium seminis the spermatozoa have a greatly diminished chance of entering the cervix, and that effluvium seminis is, in consequence, an important cause of sterility. In late years Runge (6) has laid special stress on this view, supporting it with a number of observations.

Hühner, however, advances cogent arguments against it, saying, in effect, that in the first place the retention of semen in the vaginal fornix is not specially helpful to conception, because, as has been shown, spermatozoa die rapidly in the vagina; and that in the second place, the outflow of semen is no great drawback to conception, because only those spermatozoa which are directly thrown upon the

cervix during coitus ever reach the uterus proper. Moreover, effluvium seminis, though frequently complained of by sterile women, is by no means uncommon in fertile ones. Hühner found that in 107 cases of women who had had children enquiry revealed the fact that the seminal fluid ran out after coitus in over 80 per cent. Runge found that in 53 cases of sterility there was a history of effluvium seminis in about 79 per cent. Hence it would appear that it occurs with the same frequency in fertile as in sterile women.

*The Test of Sterility in the Male.*

The man's function may be at fault in any one of three stages.

i. There may be no live spermatozoa in the testicle. This condition is, of course, incurable.

ii. There are live spermatozoa in the testicle, but owing to pathological changes in the epididymis they cannot reach the vesiculae seminales. In this condition the prognosis is bad, but not hopeless. An operation has been devised, called epididymo-vasostomy, intended, as its name implies, to bridge over the obstruction. Martin (7) reports 15 cases, in 6 of which spermatozoa were found in the condom after the operation, and in 3 of these cases pregnancy followed (quoted by Hühner).

In both of these conditions the semen consists only of prostatic secretion and contains no spermatozoa. The patient is then said to be suffering from azoöspermia.

iii. Live spermatozoa are found in the semen, but the man cannot deposit the semen in the vagina. The failure may be due to inability to obtain an erection, to stricture of the urethra, or to some malformation such as epispadias or hypospadias. Such a man is said to be impotent.

When investigating the question of a man's responsibility for a childless marriage, the first thing is to ascertain from the man whether he is able to perform the act of coitus in a normal manner. If not, that is, if he is impotent as described in paragraph iii. above, we may properly assign responsibility to him. Nevertheless some further investigation may be desirable even in such a case; and it is essential if the man claims to be normal.

This further investigation consists of an examination of the semen, and this is generally done by means of what is called a condom specimen. "Condom," which is a corruption of "Condon," the name of the inventor, is a sheath for the penis, known vulgarly as a "French letter." The patient is directed to use a condom during intercourse, and to bring it, with the contained semen, for examination. It must be kept meanwhile at body temperature, and for this purpose some kind of thermos flask is often useful. The semen is examined under the microscope; and if, in spite of proper measures in transit, only dead spermatozoa are found, or none at all, responsibility falls on the man.

If live spermatozoa are found, we cannot even yet bring in a verdict of "not guilty;" because live spermatozoa may quite well be present in the condom specimen in cases of impotence, and yet the man may be unable to deposit them in the female genital canal.

Hühner very properly lays stress on the fact that the only test that the male is normal is that live spermatozoa reach the cervical os.

To carry out this test the woman is examined as soon as possible after coitus. A sterilised bivalve speculum unlubricated is introduced into the vagina, as far as the cervix. With a small platinum loop on a long handle (the loop having first been passed through

the flame of a spirit lamp) a drop of mucus is removed from the cervical canal, placed on a slide, and at once examined under a cover-glass. In a normal case live spermatozoa are found, and their presence constitutes an absolute acquittal of the male.

The examination of the pool of semen that is often found in the posterior vaginal fornix is less conclusive than the plan detailed above; for although the finding of live spermatozoa would exonerate the male partner, he would not necessarily be condemned by the finding only of dead spermatozoa. For, as we stated when describing the normal process of insemination, spermatozoa perish rapidly in the vagina; and though they may be alive and active when first deposited there, they nearly all perish within the first hour.

For further particulars and details of technique for recovering spermatozoa from the female genitals, the reader is referred to Hühner's book, p. 107.

*The Responsibility of the Male for Childless Marriages.*

Authors differ widely in their estimate of man's responsibility. The divergence is due to the incompleteness of the methods of investigation in some cases and to deductions based on assumption in others. The fallacies have been commented upon by Hühner, from whom I quote some of the following figures. The responsibility of the male is placed :

| | | |
|---|---|---|
| By | Courty at | 10 per cent. |
| ,, | Duncan | 12 per cent. |
| ,, | Gross | 17 per cent. (192 cases collected from various authors). |
| ,, | Pajot | 15-20 per cent. |
| ,, | Brothers | 20 per cent. (250 cases). |
| ,, | Engelmann | 25 per cent. |
| ,, | Kehrer | 35 per cent. (40 cases). |
| ,, | Hühner | 41 per cent. (186 cases). |
| ,, | Noeggerath | 90 per cent. |

Noeggerath (8) is apparently obsessed by the idea that gonorrhoea is the one important factor in the causation of sterility; he states that in 90 per cent. of cases sterility is the result of a latent gonorrhoea contracted from the husband. It is, however, certain that a man who has had, or who has, gonorrhoea, is not necessarily or even frequently sterile; and if a woman contracts gonorrhoea she does not of necessity become sterile unless the disease spreads up to the tubes. So we may regard Noeggerath's figures as greatly exaggerated. Engelmann (9) includes under man's responsibility all cases of disease in the female which are directly traceable to the male. To do so is morally justifiable, but leads to fallacious results from the statistical point of view. Among Brothers' (10) 250 cases there were 178 in which the wife presented lesions of the genital tract sufficient to account for sterility. He therefore assumed that in all these cases the husband was healthy, and examined the husband only in the 72 cases in which the wife was healthy. Of the 72, 50 were held responsible for the childless marriage, and so he arrived at his figures of 50 out of 250, or 20 per cent., in which the husband was responsible. But it is evident that the husband also may have been at fault in a number of the cases in which the wife presented some abnormal condition. Hühner's figures are probably the most reliable that have been published. He made 450 examinations in 201 sterility cases; 205 examinations were of condom specimens; 216 were examinations of various parts of the female genital tract for spermatozoa, and 29 were aspirations of the male's testicles for spermatozoa.

In 57 cases the condom specimen showed live spermatozoa, but as the patient made only one visit the condom findings could not be corroborated

by those of the cervix. In 15 cases the condom result was doubtful, because only dead spermatozoa were found, and it was evident that the specimen had been allowed to become frozen. In the remaining 129 cases a close scrutiny combining the condom and cervix tests showed that the male was at fault in 76 and the female in 53, thus fixing the man's responsibility at 59 per cent. Even including as healthy males the 57 cases in which the condom showed normal spermatozoa, but the cervix test could not be made in corroboration, the male responsibility works out at 76 out of 186 or 41 per cent.

We may, I think, take it for granted that the responsibility of the male is not the same in all countries or in all grades of society. It would probably be correct to assume that the ratio of man's responsibility would be higher in those circumstances that predispose to sexual excesses, impure intercourse, and self-abuse, namely among the leisured classes and among those who marry late in life. In the opposite circumstances, namely when men live an active, busy life, when they are accustomed to a healthy self-restraint and marry young, the ratio of man's responsibility will be appreciably lower.

It is not, however, in the least important that we should be able to state with mathematical accuracy the proportion of cases in which the husband is to blame for a childless marriage. That which is important is the recognition and the realization of two practical truths :—

The first concerns men in general, and is of national importance : The man who squanders his virility in sexual profligacy is liable, by contracting disease or by the premature exhaustion of his powers, to forfeit his chance of fulfilling his high and holy destiny of fatherhood.

The second concerns more particularly the medical

profession: Inasmuch as the husband is at fault in a considerable proportion (varying between 10 and 50 per cent.) of cases of childless marriage, the wife should not be assumed to be responsible in doubtful cases and submitted to operative procedures, without obtaining definite evidence that the husband is healthy.

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## CHAPTER II

### The Proportion of Unproductive Marriages

Reliable statistics as to the frequency of sterility on a scale large enough to be regarded as conclusive are difficult to obtain. Authors differ, furthermore, as to the number of years that must elapse after marriage before a woman can be pronounced sterile. Kisch (1) states that we can only speak of true sterility when more than three years of married life have passed without conception. Duncan (2) lays down, among his "laws," that the question of a woman's being probably sterile is decided in three years of married life. He adds that only 7 per cent. of the fertile bear first children after three years of marriage. Simpson (3), in recording the results of his enquiries, says that the subjects of the marriages regarded as unproductive had lived in wedlock for upwards of 5 years.

The occurrence of a first pregnancy after much longer periods is not, however, a rare occurrence. Among my private cases I have notes of the following :

| | | | | |
|---|---|---|---|---|
| Age 36 : | married | 8 years : | now 2 months pregnant. |
| Age 33 : | ,, | 10 ,, | ,, 6 ,, ,, |
| Age 37 : | ,, | 10 ,, | ,, 6 ,, ,, |
| Age 35 : | ,, | 11 ,, | recent confinement. |
| Age 34 : | ,, | 13 ,, | extra-uterine pregnancy, verified by operation. |
| Age 40 : | ,, | 15 ,, | now 5 months pregnant. |

The age of women at the time of marriage has a great influence, as we shall see later ; and the age of men must also be taken into account.

Most of the statistics given by different authors do not take age into consideration; nor do they allow for cases of delayed pregnancy. They must, in consequence, be regarded as approximate estimates at the best. If we could obtain particulars of 1000 marriages, in which the wife was under 35 and the husband under 40 at the time of marriage, and married life had lasted for 15 years, the number of unproductive marriages in the series would give us a reliable estimate of the prevalence of sterility. But even these figures would not tell us the proportion of sterile *women* in the community, because in a number of cases the husband would be at fault. Another source of error lies in the fact that in the statistics of some authors still-births are taken into account, whilst in others they are not. Miscarriages and extra-uterine pregnancies are mostly overlooked or ignored. Yet it is obvious that a woman who has conceived is not sterile, even though the ultimate product of conception be not a living child.

I will now quote the figures of various authors, only premising that they must be accepted with the reservations aforesaid.

| | | | |
|---|---|---|---|
| Frank & Burdach | estimate sterile | marriages at | 2% |
| Ansell | estimates | ,, ,, | 8% |
| Oehren | ,, | ,, | 8·4% |
| Hedin | ,, | ,, under | 10% |
| Simpson (villages) | ,, | ,, | 10·9% |
| Simpson (aristocracy) | ,, | ,, | 16·3% |
| Duncan | ,, | ,, | 15% |
| Stark | ,, | ,, | 19% |
| Graham | ,, | ,, | 20% |
| Marton | ,, | ,, | 20% |
| Chevin | ,, | ,, | 20% |
| Rochard | ,, | ,, | 20% |
| Goehlert | ,, | ,, | 20·5% |

A few details about these figures will be of interest. With regard to those of Frank and Burdach and of

Hedin, I quote from Simpson. "In the *Dictionnaire des Sciences Médicales* (4) it is stated that Hedin, a Swedish minister, had noticed that in his parish, composed of 800 souls, one barren woman is not met with for 10 fertile. It is also stated that Frank asserted, but from what data is not mentioned, that it would be found on investigation that in most communities containing from 300 to 400 couples, at least 6 or 7 would be sterile, without anything in their physical condition to explain the fact. It seems to have been from this assertion of Frank's that Burdach, who is almost the only author who even alludes to the matter, has given the general statement that one marriage only in 50 is unproductive." (5) This is a good illustration of the way in which vague and unsubstantiated statements may find their way into the currency of medical literature.

I have not been able to trace the reference to the figures of Ansell and Oehren, which are quoted by Kisch.

Simpson had a census taken of two villages, Grangemouth in Stirlingshire, and Bathgate in West Lothian. Of 210 marriages in Grangemouth, 182 had offspring and 28 or 13 per cent. were sterile. Of 402 marriages in Bathgate, 365 had offspring; and there were also 122 widows of whom 102 had children. In all, of 467 wives and widows, 410 had children and 57 had not. Of these last 57, six had not been 5 years married, and other 6 were above the age of 45 when married. Subtracting these, we have, of 455 marriages 410 productive and 45 or 9·9 per cent. sterile. Taking the two villages together, the proportion of sterile marriages works out at 10·9 per cent.

Simpson also analysed the history of 503 marriages detailed by Sharpe in his work on the British peerage for 1833. Deducting 8 cases in which the age of the husband at the time of marriage exceeded 56, he

found that of 495 marriages 81 or 16·3 per cent. were sterile.

The difference between the proportion of sterility among the seafaring and agricultural people in the villages, and that among the leisured classes supports the suggestions that I made on page 11 as to the predisposing influences tending to sterility.

Duncan's figures (6) were derived from a careful analysis of the registers of Edinburgh and Glasgow for the year 1855. He compared the number of marriages in that year with the number of first children born during that year, arguing with sufficient reason that if the number of marriages be nearly the same for a few contiguous years, the first births in any one year will give very accurately the fertility of the contiguous years. In 1855 there were 4,447 marriages and 3,722 first deliveries of living children, leaving 725 sterile, or 16·3 per cent. But these marriages included 75 in which the woman was over 44 years of age. Excluding these, there were 4,372 marriages and 3,710 first children, leaving 654 sterile or 15 per cent.

An element of error in Duncan's figures is that they take no account of miscarriages or still-births. The figures of Stark (7) are taken from the census of Scotland, 1861; and those of Graham (8) from the Census of England, 1851. Duncan quotes extracts from these reports which show that these figures also are subject to the fallacy that no account is taken of miscarriages and still-births. The statistics of Marton refer to the population of Massachusetts; and those of Chevin and of Rochard to the population of France. According to Rochard, in the year 1888, of 10 million families in France, 2 million had no children. I have not been able to trace the original communications of these three authors, who are quoted by Kisch.

Gochlert's (9) statistics are based on the records of certain dynasties. The dynasty of the Capetings showed 19·7 per cent. of sterility in 451 marriages; the dynasty of Wittelsbach (Bavaria) showed 23·7 per cent. in 177 marriages: so that in the German ruling families, of 628 marriages, 20·5 per cent. were sterile. Gochlert took no account of miscarriages and still-births.

I have made some investigations with such data as I have available by analysing my private case-reports. My figures are free from the error of omitting miscarriages and still-births, because the parous cases include all those who had been pregnant, whatever the result of the pregnancy, whether a living or still-born child, a miscarriage or an extra-uterine pregnancy. The nulliparae had never become pregnant. The source of error in my figures lies in the fact that among patients who consult a gynaecologist and therefore present a high proportion of morbid conditions, the ratio of sterility is certain to be higher than would be the case with an equal number of women taken from the population generally. It is therefore a proper inference that the results arrived at will indicate a maximum ratio of sterility, and that the ratio for the population at large may be regarded as something under the ratio shewn in my figures. Bearing this proviso in mind, the following statistics will not be without a certain value and interest.

Among 4,500 case-papers I found that there were 3,367 married women and 1,133 spinsters. Of the married women, there were 239 cases in which there was no record as to whether they had had children or not. This leaves 3,128 cases where the parity was stated, and of these, 2,435 or 77·8 per cent. had had children; and 693 or 22·2 per cent. were sterile.

That it would be a mistake to accept 22 per cent.

as the ratio of sterility is shewn in the following table, in which the ages of the two groups are compared.

TABLE I.—A COMPARISON OF PARAE AND NULLIPARAE ACCORDING TO THEIR AGES.

| Age. | 29 and under. | | 30 to 39. | | 40 and over. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| Parae .. | 468 | 69·0% | 979 | 76·2% | 988 | 84·7% | 2435 | 77·8% |
| Nulliparae | 210 | 31·0% | 305 | 23·8% | 178 | 15·3% | 693 | 22·2% |
| Total .. | 678 | 100·0% | 1284 | 100·0% | 1166 | 100·0% | 3128 | 100·0% |

From this table it will be seen that the higher the age of the patients under consideration, the lower is the percentage of sterility. Of patients under 30, 31 per cent. were sterile; whilst of patients of 40 and over, only 15 per cent. were sterile. The obvious inference is that many of the younger patients who were childless at the time that they were seen would become pregnant later; and that, as far as the age-factor is concerned, the ratio of sterility can be ascertained with the greatest approach to accuracy only by restricting the investigation to patients over 40.

I have no extensive figures showing the age at which women have first become pregnant; but I have a group of cases of "one-child sterility," to which I shall have to refer later on, in which the age at the time of the one confinement is given. An analysis of them gives the following results.

First (and only) pregnancy at the age of—

| | | | |
|---|---|---|---|
| 24 or under | 125 cases | or 42·4 | per cent. |
| 25–29 | 114 ,, | 38·7 | ,, |
| 30–34 | 47 ,, | 15·9 | ,, |
| 35–39 | 9 ,, | 3·0 | ,, |
| Total | 295 ,, | 100·0 | ,, |

This shows that whilst 42 per cent. of the patients became pregnant before the age of 24, and 81 per cent. before they turned 30, there were 19 per cent. who became pregnant after the age of 30, and 3 per cent. after the age of 35. A first pregnancy after the patient has turned 40 is, of course, not a rare occurrence.

Besides age, another factor has to be taken into consideration in estimating the ratio of sterility, namely the length of time that a patient has been married.

An analysis of my cases of nulliparae based on their ages and on the length of time that they had been married is shown in Table II.

TABLE II.—AN ANALYSIS OF CASES OF NULLIPARAE ACCORDING TO AGE AND DURATION OF MARRIED LIFE.

| Present Age. | 29 or under. | | 30 to 39. | | 40 and over. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| Married under 2 years .. | 75 or 35·8% | | 36 or 11·5% | | 8 or 4·5% | | 119 or 17·2% | |
| „ 2 to 4 „ .. | 84 | 40·0 | 64 | 20·9 | 9 | 5·0 | 157 | 22·6 |
| „ 5 to 9 „ .. | 32 | 15·2 | 109 | 36·0 | 29 | 16·3 | 170 | 24·7 |
| „ 10 to 14 „ .. | 7 | 3·3 | 62 | 20·4 | 16 | 9·0 | 85 | 12·2 |
| „ 15 to 19 „ .. | 0 | 0·0 | 17 | 5·6 | 41 | 23·0 | 58 | 8·3 |
| „ 20 years and over | 0 | 0·0 | 4 | 1·3 | 52 | 29·3 | 56 | 8·1 |
| Time not stated .. .. | 12 | 5·7 | 13 | 4·3 | 23 | 12·9 | 48 | 6·9 |
| Total .. | 210 | 100·0 | 305 | 100·0 | 178 | 100·0 | 693 | 100·0 |

This table shows that 75·8 per cent. (35·8 + 40) of patients under 30, 32·4 per cent. of patients aged 30 to 39, and 9·5 per cent. of patients of 40 and over, had been married less than 5 years. Now it is generally agreed that a woman should not be regarded as sterile unless she has been married at least 5 years. On this basis, therefore, 75 per cent. of the cases under 30 years of age would have to be regarded as potentially fertile; 32 per cent. of those 30 to 39; and 9 per cent. of those over 40. Of the total number, 40 per cent. would be entitled to the verdict of "not proven."

On the basis of age alone, it was found that 15·3 per cent. of married women over 40 were sterile; now we find that 9·5 per cent. of these sterile women over 40 had been married less than 5 years; and although the chances of pregnancy after this age are not very great, the effect on our estimate of the ratio of sterility would be in the direction of reducing the figure.

So far our data have been based upon age and duration of married life, leaving out of consideration the question whether or not these patients were suffering from conditions that would in themselves lead to sterility. A detailed analysis of the conditions present in these cases will be given later. It will suffice here to say that I have notes of the condition of the pelvic organs in 530 cases, a number of patients having come for conditions that did not necessitate a pelvic examination.

Among the 530 patients, the pelvic organs are noted as "apparently normal" in 63, or 11·9 per cent. The number and percentage of cases at different ages is shown in Table III.

Table III. -An Analysis of Cases of Nulliparae according to Age and the Condition of the Pelvic Organs.

| Present age. | 29 and under. | | 30 to 39. | | 40 and over. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| Pelvic organs | No. | % | No. | % | No. | % | No. | % |
| apparently normal .. | 11 or | 7·1 | 35 or | 13·7 | 17 or | 13·8 | 63 or | 11·9 |
| Some pathological condition | 142 | 92·9 | 219 | 86·3 | 106 | 86·2 | 467 | 88·1 |
| Total .. | 153 | 100·0 | 254 | 100·0 | 123 | 100·0 | 530 | 100·0 |

It will be noted that among the older patients the percentage of apparently normal cases is higher than among the younger ones. The significance of

this point will be discussed in greater detail when we consider the question of age as a factor in sterility. Concentrating our attention meanwhile on the group of patients over 40, we see that in nearly 14 per cent. of these cases the pelvic organs were apparently normal; and this fact must influence us in the same direction as when we were considering the factor of the length of time that patients had been married; that is to say that the effect on our estimate of the ratio of sterility will be still further in the direction of reducing the figure.

To sum up the previous considerations:

1. The percentage of sterile cases among 3·128 married women who were seen *as patients* was 22·2.

2. Taking only the group of patients who had reached the age of 40, and had therefore had the fullest opportunities of becoming pregnant, the percentage drops to 15·3.

3. Of these patients over 40, 9·5 per cent. had been married less than 5 years, and might therefore still have a chance of pregnancy.

4. In 13·8 per cent. of these patients over 40 the pelvic organs were apparently normal, and this would be a further contributing factor to the chances of pregnancy.

5. The women under consideration sought advice in the great majority of cases on account of diseases of the reproductive organs; and many of them came expressly because they had had no children. Comparing such a group of women with an equal number drawn from the community at large, it is certain that the number of sterile women in the first group would be notably higher than in the second.

From the above premises it is a sound deduction that the proportion of sterile marriages in this country is well below 15 per cent. Of the various estimates given in the early part of this chapter, I should accept those of Simpson as being nearest to the truth, and should say that the ratio of sterility ranges from about 10 per cent. among the working population to about 16 per cent. among the leisured classes. It may be higher in some other countries;

for example, there is a general consensus of opinion that the ratio of sterility in France is exceptionally high.

Speaking generally, the welfare of a nation is favoured by fertile marriages. It is equally true that childless marriages are a source of unhappiness to many individuals, and therefore, when the causes of sterility have been discussed, it will be profitable to consider in what ways the prevalence of sterility can be diminished by prophylaxis, besides pointing out how it can be cured in certain cases by means of treatment.

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(6) Duncan, J. M. Op. cit., p. 185.

(7) Census of Scotland, 1861. Population Tables and Report. Vol. ii., p. 36.

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## CHAPTER III

### The Causes of Sterility in Women: Pathological Classification

I must first define the sense in which I use the term "sterility." A woman is barren or sterile when she is incapable of conceiving. But every woman who has not conceived is not necessarily sterile.

Before we can justly say that a woman is sterile, we must know the condition of her pelvic organs. In the presence of some diseases, such as pyosalpinx, and some malformations, such as absence of the vagina or uterus, we can say that a woman is sterile, and will remain so, whether she be a virgin or a married woman.

When there is no such obvious cause of sterility, and the woman has had the opportunity of conception but has not conceived, we may say that she is unfruitful: but we cannot say, strictly, that she is sterile. For the opportunity may be only apparent, the fault lying with the man; or there may be some condition present such as a displacement or endometritis which is a hindrance but not a bar to conception and may be remediable; or some ill-understood influence may be at work, such as "incompatibility," in virtue of which a man and woman may live together without issue, and yet each of them if united to another mate may produce offspring.

In practice, it is convenient to use the term "sterility" in a wider sense, and as being synonymous with "unfruitfulness." Thus the present

monograph, entitled "Sterility," is by no means intended to expound only those conditions that render a woman incapable of conception. Its scope is the examination of the causes of unfruitfulness in women, whether remediable or not. Clinically, married women without children are sterile until the state of their pelvic organs and the conditions of their married life have been investigated.

In the previous chapter I have used the expressions "parous" and "nulliparous" to denote respectively women who have been pregnant and those who have not. This, again, is a use of terms that are convenient rather than strictly accurate. A parous woman is one who has borne a child, and it is doubtful whether the term could be applied correctly to a woman whose only pregnancy has resulted in a two-months miscarriage. But if we limit the term to a woman who has been delivered of a viable child, we might still be in difficulties, and have to describe a woman whose six-months child has survived as parous; and one whose seven-months child has perished as nulliparous.

In these pages, at any rate, we shall mean by "parous" a woman who has been pregnant: and by "nulliparous" one who has not.

## Classification.

The causes of sterility are variously tabulated by different authors. A systematic enumeration of all the possible causes is best set forth in a classification based on pathological anatomy. But for the study of sterility as it is met with in practice, a classification based on clinical features is more useful and more instructive.

I will first submit a pathological classification which is an amplified version of one that I formulated in an article on sterility written some years ago (1);

and I shall proceed to sketch out the conditions named therein in their broad outlines. Afterwards I will submit a clinical classification, which will serve as a synopsis of the more detailed study of the causes of sterility in women and of the conditions that are found associated therewith.

PATHOLOGICAL CLASSIFICATION OF THE CAUSES OF STERILITY IN WOMEN.

A. *Defective Ovulation* due to
   1. Absence of the ovaries.
   2. Under-development of the ovaries.
   3. Ovarian disease.
   4. Constitutional causes.
   5. Ovarian immaturity and atrophy.

B. *Defective Conditions of the Genital Passages or their Secretions.*
   1. Defects of patency.
      *a.* Absence of the vagina.
      *b.* Atresia of the vagina.
      *c.* Atresia of the os uteri externum or internum.
      *d.* Atresia of the Fallopian tube.
   2. Defects of the lining membranes of the passages.
      *a.* Vaginitis.
      *b.* Endometritis.
      *c.* Salpingitis.
   3. Defects of structure of the uterus and vagina.
      *a.* Stenosis and under-development of the vagina.
      *b.* Congenital under-development of the uterus.
      *c.* Hyperplasia and tumours of the uterus.
      *d.* Atrophy of the uterus.
   4. Defects of shape or position of the uterus.

C. *Functional Defects.*
   1. Vaginismus.
   2. Dyspareunia.
   3. Sex incompatibility.

## A. *Defective Ovulation.*

*Absence of the ovaries* is very rare, and, indeed is found only in association with other gross malformations.

*Under-development of the ovaries* is also rare, but the condition may be present in a patient whose general development is normal.

*Ovarian disease.*—When the ovaries are the seat of cystic or solid tumours, ovulation is necessarily hindered. It may nevertheless occur, and even in such a way as to allow of conception, if only a small portion of ovarian tissue has remained unaltered.

*Constitutional causes.*—Some diseases such as anaemia, myxoedema, and febrile conditions are associated with suppression of menstruation; and it may be presumed that in these cases ovulation is inhibited. Faulty metabolism probably has the same effect; thus, it is well known that obesity is unfavourable to conception. Certain drugs, such as opium and morphia, arrest ovulation when they are taken for a long time.

*Ovarian immaturity and atrophy.*—Before puberty, ovulation is in abeyance, and this stage requires no further notice, inasmuch as sterility comes into consideration only in dealing with the age of sexual maturity. For the same reason, we have no interest in the cessation of ovulation at the time of the normal menopause.

There are cases, however, of premature menopause, of which we shall have to speak later.

B. *Defective Conditions of the Genital Passages or their Secretion.*

1. *Defects of patency.*

*Absence of the vagina* is an obvious and incurable cause of sterility. Happily it is rare.

*Atresia of the vagina.*—These cases vary in degree, from an absence of the lower part of the vagina to a mere membranous occlusion of its lower end. In such cases menstruation may occur, with the result

that its products are retained, the condition being known as haematocolpos.

*Atresia of the os internum or externum.*—It is very doubtful whether this ever occurs as a congenital condition. It usually follows some inflammatory process, or the application of strong caustics to the cervix, and is therefore an acquired condition. The first effect, during the period of sexual maturity, is haematometra; and if the retained menstrual products become infected, the uterus is converted into a bag of pus (pyometra). This is specially apt to occur in conjunction with cancer of the cervix.

After the patency of the cervical canal has been restored, menstruation is re-established; but the changes in the wall of the uterus brought about during the period of closure would almost certainly negative the possibility of conception.

*Atresia of the Fallopian tube.*—Apart from occlusion of the tubal ostium as the result of pyosalpinx, the tube is sometimes occluded in some part of its course by conditions that may be described as congenital, inasmuch as they may occur during foetal life; though they are not in a strict sense developmental.

2. *Defects of the lining membranes of the passages.*

Inflammation of the genital tract, leading successively to *vaginitis*, *endometritis*, and *salpingitis*, causes sterility in three ways; first, the pathological secretions tend to kill the spermatozoa; secondly, if they succeed in entering the cervix their upward progress is impaired by the damaged mucosa of the uterus and tubes; thirdly, the tubes may become closed.

We shall have to deal with this subject in detail later on.

3. *Defects of structure of the uterus and vagina.*

*Stenosis and under-development of the vagina* lead

to sterility chiefly by prohibiting intercourse; but if the mechanical difficulty can be overcome, pregnancy may follow.

*Congenital under-development of the uterus* varies greatly in degree from a mild form, in which the uterus is rather under the normal length, the sound passing in to a depth of 2 to 2½ inches, to an extreme form, when the uterus may be described as rudimentary. In even the milder forms of under-development the chances of pregnancy are poor; in the more pronounced forms they are non-existent.

*Hyperplasia and tumours of the uterus.*—These conditions are detrimental to pregnancy in proportion to the encroachment of the tumour on the uterine mucosa. The relation between uterine fibroids and sterility is a subject of special interest which will be considered in a later chapter.

*Atrophy of the uterus* occurs in conjunction with ovarian atrophy and as a sequel to the removal of the ovaries by operation. In either case the phenomena presented are those of the menopause.

There is another form of atrophy, known as fibrosis of the uterus, which is the result of changes, probably inflammatory, in the uterine wall.

Sterility is the necessary and incurable result of uterine atrophy.

4. *Defects of shape or position of the uterus.*

Under this heading we have to consider the influence on sterility of anteflexion, retroversion and retroflexion, and prolapse of the uterus. As they will have to be discussed in some detail I need say no more here than this: that these conditions come under the category of those that are unfavourable to conception, and not of those that are an insuperable bar.

C. *Functional Defects.*

*Dyspareunia.*—This is nearly always due to some local condition that makes intercourse painful. It may be an abrasion or cut at the vaginal orifice, painful hymeneal caruncles, urethral caruncle, or inflammation of the duct of Bartholin, or a generalized vulvo-vaginitis. In all these cases the pain is complained of at the entrance of the vagina, and at the beginning of the act of intercourse.

Or the pain may be more deeply seated, resulting from pressure on inflamed or prolapsed ovaries and tubes.

In other cases the complaint is of difficulty rather than of pain, and is due to some mechanical obstacle, such as narrowing of the vagina, or the pressure of tumours in the pelvis.

*Vaginismus.*—While dyspareunia may be said to be due to anatomical conditions, vaginismus is a physiological defect, in which the muscles at the entrance of the vagina are thrown into a state of painful contraction by nervous and emotional influences.

These factors lead to sterility only as long as they remain operative by preventing intercourse.

*Sex Incompatibility.*—While we know that this exists, we have no knowledge of its mode of action, nor of the means by which it might be overcome. Certainly, if the husband and wife cannot get over the difficulty when assisted by mutual affection and goodwill the medical profession is not likely to succeed.

REFERENCE

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## CHAPTER IV

### The Causes of Sterility in Women—Clinical Classification

For the study of sterility in its clinical aspects I propose to divide it into three groups.

1. *Functional Sterility.*—In this group the patients are clinically sterile, inasmuch as they have not become pregnant. But owing to the conditions of their married life they have not had a proper chance of becoming pregnant. Whether, given the opportunity, any particular patient would conceive, we cannot tell beforehand. With altered conditions, either as the result of treatment, or by reason of the more correct performance of the act of intercourse, some of them will become pregnant, others may not. This group might be designated with equal appropriateness as that of "Apparent Sterility" or "Potential Fertility." In other words, if the test of opportunity can be applied, the cases become eliminated from this group, some being liberated into the ranks of the fertile, others being re-classified in our next group, that of primary sterility.

2. *Primary Sterility.*—This group comprises those patients who, notwithstanding the fact that they have had a chance of conceiving, have not done so. I shall subdivide them into two classes.

(*a*) *Congenital Sterility*, in which such conditions are present that the patient has at no time been even potentially fertile.

(*b*) *Acquired Sterility*, in which the pelvic organs were at first normal, but before conception has ever taken place some pathological process has supervened to interfere with the function of childbearing.

3. *Secondary Sterility.*—In this group the patient has been pregnant and has subsequently developed some condition that has deprived her of the ability to become pregnant again. Many of these conditions are the same as those that lead to primary acquired sterility. But there are some additional conditions incidental to the very fact of childbearing.

In this group are included those cases that have been specially described as "One-Child Sterility." But that is a somewhat artificial limitation to which I shall not adhere.

The conditions which I propose to review in discussing the clinical aspects of sterility are set forth in the following synopsis; and for the sake of completeness I shall indicate, by the letters in brackets following each condition, the place that it occupies in the pathological scheme of classification set forth in the preceding chapter.

1. *Functional Sterility.*
   - Impotence of the husband.
   - Non-occurrence of coitus.
   - Vaginismus (C. 1).
   - Dyspareunia (C. 2).
   - Sex incompatibility (C. 3).

2. *Primary Sterility.*
   - A. *Congenital Sterility.*
     - Malformations.
       1. Preventing intercourse.
          - Absence of the vagina (B. 1 *a.*).
          - Atresia of the vagina (B. 1 *b.*).
          - Stenosis of the vagina (B. 3 *a.*).

2. Allowing of intercourse.
    - Absence of the ovaries (A. 1).
    - Under-development of the ovaries (A.2)
    - Atresia of the Fallopian tubes (B. 1 *d.*).
    - Atresia of the os uteri (B. 1 *c.*).
    - Under-development of the uterus (B. 3 *b.*).
    - Anteflexion and stenosis of the uterus (B. 4).

B. *Acquired Sterility.*
- Injuries of the vagina and cervix causing stenosis and atresia.
- Cessation of ovarian activity (A. 5).
- Pelvic inflammation.
    - Gonorrhoea.
    - Vaginitis and endometritis (B. 2 *a.* and *b.*)
    - Salpingitis (B. 2 *c.*).
    - Peritonitis.
- Uterine displacements (B. 4).
- Ovarian tumours (A. 3).
- Uterine tumours (B. 3 *c.*).
- Uterine fibrosis (B. 3 *d.*).

3. *Secondary Sterility.*
- Effects of labour.
- Other causes of acquired sterility (as above).

In order to obtain some data as to the frequency with which various pathological conditions occurred in cases of sterility, I have analysed the records in my private case-papers in which the necessary particulars are given. I mentioned in Chapter II. that of 3,128 cases where the parity was noted there were 693 cases of women who had never been pregnant; of these there were 530 in which the condition of the pelvic organs was stated. It will be convenient to give the results of this analysis before passing on to the systematic description of the causes of sterility and of conditions found in association therewith.

The cases are tabulated as follows:—

In Table IV. according to the present age of the patients.

In Table V. according to the number of years that they had been married.

In Table VI. according to their age at the time of marriage.

In each table the number and percentage of cases in which various conditions were present are given.

The conditions recorded in these tables are not to be regarded as a tabulation of the causes of sterility. Some of them, such as tubal disease and endometritis, rank properly as definite causes; others, such as anteflexion and retroversion, may be regarded as predisposing causes. Some again, such as ovarian tumours, may have an accidental association rather than a causal relation with sterility; whilst in the case of uterine fibroids, I shall endeavour, in a later chapter, to show that they are the effect rather than the cause of sterility.

It will be observed that in 63 cases or about 12 per cent. of the cases the pelvic organs were "apparently normal." It is probable that a careful examination of the 63 husbands would have fixed the responsibility on a large proportion of them.

Of the pathological conditions present, *anteflexion* stands out conspicuously, as it was found in 24 per cent. of all the cases. From this we may properly infer that anteflexion, and the other uterine features that usually accompany it, such as stenosis of the canal and conical cervix, have an important influence in the causation of sterility.

The condition found next in frequency was that of *uterine fibroids*. It might be supposed on this account that uterine fibroids are largely to blame. But there is an important difference in the distribution of anteflexion and fibroids. It will be seen in Table V. that out of 262 patients married not longer

TABLE IV.—CASES OF STERILITY TABULATED ACCORDING TO PRESENT AGE.

| Present condition. | 24 and under. | | 25–29 | | 30–34 | | 30–39 | | 40 and over. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Apparently normal | 2 | 5·7 | 9 | 7·6 | 21 | 13·7 | 14 | 14·2 | 17 | 13·8 | 63 | 11·9 |
| Anteflexion and stenosis | 13 | 37·2 | 40 | 34·2 | 40 | 25·8 | 26 | 26·2 | 9 | 7·3 | 128 | 24·1 |
| Malformations | 1 | 2·8 | 4 | 3·5 | 3 | 1·9 | 1 | 1·0 | 1 | 0·8 | 10 | 1·9 |
| Vaginismus or no coitus | 1 | 2·8 | 6 | 5·1 | 5 | 3·2 | 6 | 6·1 | 6 | 4·9 | 24 | 4·5 |
| Endometritis and vaginitis | 8 | 22·8 | 13 | 11·0 | 19 | 12·3 | 10 | 10·1 | 3 | 2·4 | 53 | 10·0 |
| Tubal Disease | 5 | 14·4 | 17 | 14·1 | 17 | 11·0 | 11 | 11·1 | 8 | 6·5 | 58 | 10·9 |
| "Peritonitis" | 1 | 2·8 | 3 | 2·5 | 10 | 6·4 | 5 | 5·1 | 4 | 3·2 | 23 | 4·4 |
| Retroversion | 1 | 2·8 | 15 | 12·7 | 22 | 14·3 | 9 | 9·1 | 7 | 5·7 | 54 | 10·2 |
| Ovarian Tumours | 3 | 8·7 | 7 | 6·0 | 7 | 4·4 | 5 | 5·1 | 11 | 9·0 | 33 | 6·2 |
| Fibroid Tumours | — | | 3 | 2·5 | 10 | 6·4 | 11 | 11·1 | 54 | 44·0 | 78 | 14·8 |
| Premature Menopause | — | | 1 | 0·8 | 1 | 0·6 | 1 | 1·0 | 3 | 2·4 | 6 | 1·1 |
| Total .. | 35 | 100·0 | 118 | 100·0 | 155 | 100·0 | 99 | 100·0 | 123 | 100·0 | 530 | 100·0 |

TABLE V.—CASES OF STERILITY TABULATED ACCORDING TO THE NUMBER OF YEARS MARRIED.

| Present condition. | 1 year. | | 2–5 yrs. | | 6–10 yrs. | | 11 yrs. and over. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Apparently normal | 3 | 4·5 | 23 | 11·7 | 19 | 13·4 | 18 | 14·2 | 63 | 11·9 |
| Anteflexion and stenosis | 21 | 32·0 | 69 | 35·6 | 29 | 20·4 | 9 | 7·1 | 128 | 24·1 |
| Malformations .. | 3 | 4·5 | 4 | 2·0 | 2 | 1·4 | 1 | 0·8 | 10 | 1·9 |
| Vaginismus or no coitus | 5 | 7·5 | 8 | 4·0 | 5 | 3·5 | 6 | 4·7 | 24 | 4·5 |
| Endometritis and Vaginitis | 7 | 10·6 | 21 | 10·7 | 18 | 12·6 | 7 | 5·6 | 53 | 10·0 |
| Tubal Disease .. | 7 | 10·6 | 21 | 10·7 | 15 | 10·6 | 15 | 11·9 | 58 | 10·9 |
| "Peritonitis" .. | 1 | 1·5 | 8 | 4·0 | 11 | 7·7 | 3 | 2·5 | 23 | 4·4 |
| Retroversion .. | 13 | 19·8 | 20 | 10·2 | 13 | 9·3 | 8 | 6·3 | 54 | 10·2 |
| Ovarian Tumours .. | 1 | 1·5 | 12 | 6·1 | 8 | 5·6 | 12 | 9·5 | 33 | 6·2 |
| Fibroid Tumours .. | 4 | 6·0 | 9 | 4·5 | 20 | 14·1 | 45 | 35·8 | 78 | 14·8 |
| Premature Menopause | 1 | 1·5 | 1 | 0·5 | 2 | 1·4 | 2 | 1·6 | 6 | 1·1 |
| Total .. .. | 66 | 100·0 | 196 | 100·0 | 142 | 100·0 | 126 | 100·0 | 530 | 100·0 |

TABLE VI.—CASES OF STERILITY TABULATED ACCORDING TO AGE AT MARRIAGE.

| Present condition. | 24 or under. | | 25–28 | | 29–32 | | 33–36 | | 37 and over. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Apparently normal | 22 | 10·8 | 19 | 10·7 | 8 | 10·0 | 8 | 18·6 | 6 | 24·0 | 63 | 11·9 |
| Anteflexion and stenosis | 51 | 25·0 | 42 | 23·7 | 18 | 22·5 | 12 | 28·0 | 5 | 20·0 | 128 | 24·1 |
| Malformations | 4 | 2·0 | 4 | 2·2 | 2 | 2·5 | — | | — | | 10 | 1·9 |
| Vaginismus or no coitus | 7 | 3·4 | 11 | 6·2 | 2 | 2·5 | 3 | 6·9 | 1 | 4·0 | 24 | 4·5 |
| Endometritis and Vaginitis | 27 | 13·3 | 16 | 9·0 | 8 | 10·0 | 1 | 2·3 | 1 | 4·0 | 53 | 10·0 |
| Tubal Disease | 32 | 15·7 | 16 | 9·0 | 7 | 8·7 | 52 | 4·6 | 1 | 4·0 | 58 | 10·9 |
| "Peritonitis" | 10 | 4·9 | 9 | 5·0 | 4 | 5·0 | — | | — | | 23 | 4·4 |
| Retroversion | 14 | 6·8 | 23 | 12·9 | 10 | 12·5 | 6 | 14·0 | 1 | 4·0 | 54 | 10·2 |
| Ovarian Tumours | 14 | 6·8 | 10 | 5·6 | 5 | 6·25 | 2 | 4·6 | 2 | 8·0 | 33 | 6·2 |
| Fibroid Tumours | 22 | 10·8 | 25 | 14·1 | 15 | 18·75 | 9 | 21·0 | 7 | 28·0 | 78 | 14·8 |
| Premature Menopause | 1 | 0·5 | 3 | 1·6 | 1 | 1·25 | — | | 1 | 4·0 | 6 | 1·1 |
| Total .. | 204 | 100·0 | 178 | 100·0 | 80 | 100·0 | 43 | 100·0 | 25 | 100·0 | 530 | 100·0 |

than 5 years anteflexion was present in 90 or over 34 per cent.; but fibroids were present in only 13, or under 5 per cent. On the other hand, of 126 patients married 11 years or longer, anteflexion was present in 7 per cent., and fibroids in 35 per cent. Clearly, the fibroids played no important part in preventing conception in the earlier years of married life.

*Tubal disease* was present in about 11 per cent. of the cases and may be considered as the cause of their sterility.

*Endometritis* accounted for 10 per cent. and is also to be regarded as the cause. Cases of vaginitis are included in this group.

*Retroversion* (including retroflexion) also formed 10 per cent. This is not properly a cause of sterility, because, as we know, women with a retroversion do become pregnant. But I have no doubt that retroversion is unfavourable to conception, and so may be described as a predisposing factor.

*Ovarian Tumours* were present in about 6 per cent. of cases. They have the characteristic in common with uterine fibroids that they are found more frequently in those who have been married longer (in 9·5 per cent of patients married over 10 years, as against under 5 per cent. of those married 5 years or less).

In 4·5 per cent of the cases the patient showed signs of *vaginismus* or stated that coitus was painful or had not taken place. These patients come under the category of "potentially fertile" just as unmarried women would.

In 4·4 per cent. there were conditions of pelvic inflammation, which I have grouped, for brevity, under the term *peritonitis*. We may include this in the definite causes of sterility, because the effect of pelvic inflammation would almost certainly be to seal up the open ends of the Fallopian tubes, or to lead

to adhesions which would equally interfere with the tubal functions.

Lastly, we have two small groups, *malformations*, and cases of *premature menopause*, forming together 3 per cent. of the total. They are respectively the anatomical and the physiological expressions of defective sexual development which, though not a frequent, is certainly the most uncompromising, obstacle to conception.

## CHAPTER V

### Functional Sterility

Among my 530 cases of sterility (Tables IV., V. and VI.) there were 24 cases, or 4·5 per cent. in which the patient complained of dyspareunia or presented symptoms of vaginismus or stated that she had never had intercourse. There were 63 other cases (11·9 per cent.) in which the pelvic organs were apparently normal. Thus we have in all 87 cases, or 14·4 per cent., that may be regarded as instances of functional sterility. Inasmuch as most of these patients came as general gynaecological cases, and were not specially studied as cases of sterility, I have notes in only a few instances of the husband's marital fitness; but it is a reasonable assumption that the husband was at fault in a considerable number of cases. Among the remainder, there were some for whom the prospect of motherhood would still be good, first from the point of view of age, for 44 of them, or just one half, were still under 35; and secondly from the point of view of the duration of marriage, for 39 of them had not been married more than 5 years.

The relation between age and sterility is of great interest, and will be discussed under the heading of "Acquired Sterility," when speaking of the cessation of ovarian activity.

#### Impotence of the Husband.

When this cause of functional sterility has been diagnosed, the husband should be instructed to

consult a genito-urinary specialist, who will be in the best position to give information on the two questions which both husband and wife will wish to have settled. These are, first, whether the condition is remediable: secondly, what is the proper treatment to adopt.

The duty of the gynaecologist in these cases is chiefly to insist that in cases of doubt the virility of the man should be established before the woman is subjected to operative treatment. And we shall find, when speaking of the treatment of sterility, that in some cases of impotence of the male the assistance of the gynaecologist may be invoked to carry out an "artificial insemination."

Among my notes are the two following cases illustrating the question of impotence of the husband.

Case 1.—A young woman, aged 27, had been married 2 years, and wanted to know what were the chances of pregnancy, and whether, if children were born, they would be healthy. The grounds of her disquietude were, first that she had practised self-abuse when younger, and secondly that her husband had done the same, and that it was only with difficulty that he could get an erection. On examination, the pelvic condition was itself such as to lead one to give a not too favourable prognosis, as the uterus was underdeveloped and retroverted. I shall have occasion to refer to this case again when speaking of retroversion; here I will only say that in spite of the drawbacks on both sides she bore two children, respectively 4 and 6 years after I first saw her.

Case 2.—The patient was 42 years of age, and had been married 20 years. She stated that she had never had intercourse, as her husband had always been quite impotent. There was no question of the possibility of pregnancy in this case.

### Non-Occurrence of Coitus

In some cases marriage is not consummated, not because of any physical defect in either husband or wife, but through nervousness, shyness, or ignorance

on the part of one or both. In other cases the first attempt was painful and was not repeated, though the pain may not have been anything more than is normal. The notes in some of my cases are as follows :

Case 3.—A patient aged 32, had been married 4 years. She came on account of difficulty of intercourse, and said that she thought it had never been effected. The examination supported this view, as the vaginal orifice admitted one finger with difficulty. A dilatation was carried out under anaesthesia. There was probably a nervous element in this case ; for four years later when I saw her again she had lost her husband and married again, and since her second marriage she had suffered from vaginismus.

Case 4.—A woman aged 40, had been married 4 years. (In these notes I do not distinguish between leisured "ladies" and working "women" : they are all described as "women".) She said that she had never had proper intercourse, and volunteered the statement that she was "very nervy." On examination the hymen was not quite torn through, and only one finger could be introduced, with difficulty, into the vagina. Dilatation was carried out under anaesthesia. At her age the prospect of pregnancy was not good.

Case 5.—This patient, like the preceding one, was married at the age of 36, but had been married only 3 years, and wanted to know what were her chances of pregnancy, as she thought that coitus had never been properly consummated. The vaginal orifice was small, but admitted one finger readily. Dilatation with graduated specula was carried out. Owing to her age I did not give a favourable prognosis.

Case 6.—This patient, aged 37, and married 8 years, was seen on account of hydroperitoneum. When I asked her if she had had children, she said that she "had not had the opportunity of pregnancy."

Case 7.—A woman of 50 suffering from menorrhagia. When asked concerning children, she said that she had been married 26 years ; but that when she was married the period was on, and she "had never had any provocation since."

This state of affairs is probably more likely to occur when the woman is not very young at the time

of marriage: it will be noted that 4 of the above 5 patients were respectively 28, 29 and 36 (2 cases) when they were married. Nevertheless it may happen with younger women also, as in the last case, married at the age of 24.

If the patient seeks advice while she is still young some instruction, and perhaps dilatation of the vaginal orifice under anaesthesia, may be all that is required to ensure a happy event. But if the woman has attained the age of 35 to 40, the outlook is not very favourable.

### Vaginismus.

This condition was first described by Sir James Simpson (1) in a paper read before the Obstetrical Society of Edinburgh on November 14, 1860. He adopted for it the hybrid term "Vaginodynia" which happily did not long survive.

The term "Vaginismus" was proposed by Marion Sims (2) in a paper read before the Obstetrical Society of London in 1861, wherein he gave an excellent and graphic account of the condition. In 1874 W. Schnegerieff (3), of Moscow, read a paper, also before the Obstetrical Society of London, under the title "On Vaginismus (Dyspareunia of Dr. Barnes)," in which he stated that Scanzoni had described 34 cases, the clinical features of which were different from those described by Sims, inasmuch as they presented various organic lesions. Schnegerieff showed that there are two separate conditions, the first with organic lesions, the second essentially nervous. Although, curiously enough, there is in the paper no mention of Barnes, nor of dyspareunia, except in the title, the inference contained therein is that the term "Vaginismus" should be restricted to the nervous type described by Sims, and that therefore the organic type described by Scanzoni

should receive the name "Dyspareunia" as suggested by Dr. Barnes.

Kisch (4), writing much later, uses the expression "Vaginismus" to include "Dyspareunia;" but this practice appears to me to be confusing, and I shall follow Schnegerieff in drawing a sharp distinction between the two, which may be defined thus :—

*Vaginismus* is a nervous condition leading to painful spasm of muscles both at the vaginal orifice and elsewhere, set up by the slightest touch of the external genitals, and even by the thought of it, and quite independent of any organic lesion. Coitus is thereby rendered impossible.

*Dyspareunia* is a condition in which intercourse is rendered painful by some organic lesion at the vulvar orifice, in the vagina, or more deeply-seated in the uterus or appendages.

Sims gives the following description of vaginismus, in his first case, a lady of 45 who had been married at 20 and had been an invalid ever since. "I attempted to make a vaginal examination, but failed completely, the slightest touch at the mouth of the vagina producing most intense suffering. Her nervous system was thrown into great commotion; there was a general muscular agitation; her whole frame was shivering as if with the rigors of an intermittent. She shrieked aloud, her eyes glaring wildly, while tears rolled down her cheeks, and she presented the most pitiable appearance of terror and agony. Notwithstanding all these outward involuntary evidences of physical suffering, she had the moral fortitude to hold herself on the couch, and implored me not to desist from my efforts if there was the least hope of finding out anything about the inexplicable condition. After pressing with all my strength for some minutes, I succeeded in introducing the index finger into the vagina up

to the second joint, but no further. The resistance to its passage was so great, and the vaginal contraction so firm, as to deaden the sensation of the finger, and thus the examination revealed only an insuperable spasm of the sphincter vaginae." Later, an examination was made under ether. "As soon as she was fully under the influence of ether, greatly to my surprise I found the mouth of the vagina completely relaxed, and the vagina itself perfectly normal, not presenting the least variation from health."

In recent years Dr. Ellice McDonald (5) has laid stress on the fact that vaginismus is a neurosis; and her testimony, being that of a medical woman, appears to me to be valuable. She says, "Vaginismus is not as a rule the result of a vaginal or a vulvar hyperaesthesia, and the treatment must be psychical. It is a true neurosis, the origin of which must be sought for, and is but seldom dependent on local irritative conditions of the vulva. The muscular structures of the vulva and vagina are not the only ones that obstruct, but the muscles of the thighs and back take part in the contraction. This is a combination of adduction, inward rolling of the thighs, lordosis of the vertebrae, closure of the pelvic outlet, and dislocation of the entire body."

The pen-picture thus drawn is that of a woman making a resolute effort to defend her virginity against an actual assault: and, in effect, the woman suffering from vaginismus is prompted by an instinctive but morbid emotion, in which fear no doubt predominates, to adopt an attitude of resistance such as an assaulted woman would adopt in defence of her honour. Vaginismus is not a common condition, and I have met with only two or three well-marked examples.

Case 8.—Thus I saw a woman, aged 39, who had been married 6 years: she was anxious to know if she could become

pregnant ; but she thought that intercourse had not taken place properly, "as she was afraid of it." On making an examination there was such a marked spasm of the muscles surrounding the vaginal orifice, that two fingers could not be introduced ; and it was evident that the examination caused nervous distress and excitement. I advised dilatation of the vaginal orifice under anaesthesia, but the patient could not screw up her courage to face it.

Case 9.—In another case a woman, aged 26, had been married 4 years ; excessive nervousness had rendered intercourse almost impossible, and she had so brooded over the matter that she became the subject of hysterical mania. When I saw her, she was in a private asylum : and her medical attendant was of opinion that if local conditions could be improved by a dilatation under anaesthesia her mental condition might be improved thereby. This was accordingly done. Under the anaesthetic, the vagina admitted two fingers readily, but as I had not made any examination without anaesthesia I cannot say how much spasm existed normally.

The spasmodic contraction of the sphincter vaginae, which is so striking a feature of vaginismus, is an exaggeration of the normal condition. Even apart from vaginismus, the muscles constricting the vagina may become the seat of a tonic contraction amounting to cramp ; the muscles affected are the transversi perinei constricting the orifice, and the levator ani situated about an inch from the entrance. In illustration of the degree to which this spasm may be carried, Kisch (6) quotes a case related by Dr. E. Davis (but without giving the reference) in which a gentleman, on entering his coachman's room, found the coachman and a maid in a very compromising position. All attempts by the culprits to free themselves from one another were unavailing and resulted in great pain to both. Dr. Davis was then sent for and only succeeded in freeing the pair by chloroforming the maid. He noted that the swollen and livid penis presented two strangulation marks, shew-

ing that the sphincter had a spasmodic contraction at two levels.

Some German writers, such as Schröder, Zweifel, Winckel, A. Martin, and Veit, in speaking of the causes of Vaginismus, include the various pathological conditions which render coitus painful. From this point of view, the conditions that cause dyspareunia may, in extreme cases, produce vaginismus, as the result of the dyspareunia. I have stated my preference for keeping the two conditions distinct, and for classing Vaginismus as a pure neurosis.

It is evident that if we regard vaginismus as a psychical manifestation the treatment must also be psychical. I shall reserve what I have to say on this subject, as it will be convenient to describe the treatment of all forms and causes of sterility together, in a later chapter.

### Dyspareunia.

This term, first introduced by Robert Barnes, means "painful intercourse." * The pain may be due to widely different conditions, but the result in all of them is the same, namely, that because intercourse is painful, it does not take place, either because the woman does not permit it, or because the man is too considerate to enforce it. Sterility thus results from the want of opportunity for conception. The conditions that produce dyspareunia are the following:—

*Narrowness of the Vagina.* When the vagina is narrowed to a moderate degree, intercourse may be possible, but it is more or less painful. In most cases, however, and in all cases where the narrowing is marked, intercourse is not possible; and such conditions come more properly under the description of primary sterility due to stenosis of the vagina—a subject which will occupy our attention in the next

chapter. As a rule when we speak of dyspareunia, we mean that intercourse is possible but painful.

*Painful Hymeneal Caruncles.*—The carunculae or remnants of the hymen, which are the result of coitus having taken place, are as a rule not sensitive or painful to touch, but sometimes we find them so. They then appear as reddened patches round the vaginal orifice, and they sometimes resemble closely the kind of caruncle that is found at the orifice of the urethra.

*Urethral Caruncle.*—This commonly arises in connection with Skene's ducts at the lower end of the posterior wall of the urethra. Clinically, two types are found: in one there is little or no pain, and the source of discomfort is the tendency to bleed readily. In the other type bleeding is not a conspicuous feature, but the caruncle is very tender to the touch: so much so, indeed, that the act of urination is painful. This is the type that causes dyspareunia. It seldom occurs before middle-age, and therefore it is only in women who have married rather late in life that it is likely to figure as a cause of dyspareunia leading to functional sterility.

*Inflamed Bartholinian Cyst.*—An ordinary Bartholinian cyst is not commonly painful unless it gets very large; but if it becomes inflamed and its contents become infected so that a Bartholinian abscess results, it is very painful to the touch, and would therefore cause an acute type of dyspareunia.

*Cuts and Abrasions about the Vaginal Orifice.*—These may be due to a variety of forms of traumatism; they occur perhaps most frequently in the early days of married life, before the little tears due to rupture of the hymen have had time to heal; and especially when the vaginal orifice is rather small and the membrum virile rather large. Such cuts are comparable to a "cracked lip;" or a fissure in

ano; they do not look much, but they are apt to be very painful.

*Vulvo-Vaginitis.* It is easy to understand that vaginitis and vulvitis cause great pain on intercourse. Naturally, these conditions are generally the result of intercourse, and especially of a gonorrhœal infection; but they may be due to infection from other causes.

All the conditions enumerated produce pain which is referred to the entrance of the vagina. But there are others that cause a more deeply-seated pain.

*Prolapse of the Ovary.* When the ovary is prolapsed into the pouch of Douglas, it is apt to be pressed upon during coitus, and this may cause a quite definite degree of pain even when the ovary is healthy. The pain may not be constant; and in the case of one patient whom I saw a simple and probable explanation of this want of constancy was forthcoming. The left ovary was large and definitely prolapsed; and the patient suffered from constipation and flatulence. It seemed reasonable to suppose that when the sigmoid became distended with solid matter or gas the ovary became pressed further downwards and towards the middle line, and was thus subject to a pressure which was not felt when the lower part of the bowel was empty and flaccid.

*Tubo-Ovarian Inflammation.* In the case of salpingitis or pyosalpinx with its accompanying oöphoritis, the normal ovarian sensitiveness to pressure becomes increased to the point of intense pain. And as an enlarged tube or ovary nearly always tends to assume a lower position in the pelvis, the tender ovary comes well within the range of pressure. The pain may be referred to one or both sides.

*Pelvic Inflammation* of any kind causes dyspareunia. Whilst tubal disease is the most common cause of pelvic peritonitis, it may be due to such other condi-

tions as an ovarian cyst with a twisted pedicle, chronic and subacute appendicitis, and other forms of bowel inflammation. Pelvic cellulitis will equally cause pain on intercourse.

*Retroversion of the Uterus.*—The uterus itself is not very sensitive, unless inflamed; and when retroversion is found associated with dyspareunia the pain is usually due not so much to pressure on the uterus as to transmission of pressure through the displaced uterus to the ovaries, which in such cases are nearly always drawn down into a position of prolapse.

*Tumours of the Uterus.*—Sometimes the uterus is impacted low down in the pelvis by reason of a fibroid tumour in its walls. The vagina may be pushed forward in close relation to the pubes, or otherwise encroached upon by the tumour. Intercourse may be merely difficult or impossible because there is no room, not because it causes pain; but it may also be painful, and the pain is probably due, as in the case of retroversion, to the transmission of pressure to the ovaries.

Lastly one meets with cases of dyspareunia in which no obvious cause of pain can be discovered, and yet there is no evidence of spasmodic contraction such as would lead one to class them as cases of vaginismus.

The following are some typical examples of dyspareunia:—

Case 10.—A patient, aged 39, of a rather neurasthenic type, had been married 14 years; she stated that she had never had proper intercourse on account of the pain it caused. On examination there was no obvious reason for dyspareunia; in fact the vagina admitted two fingers, and a medium-sized speculum easily.

Case 11.—A patient, aged 32, had been married 12 years; she stated that she had always had pain on intercourse, the pain being referred to the entrance of the vagina. She also

said that she always had "inflammation," and suffered from some discharge. On examination the vaginal orifice looked small, yet admitted two fingers readily; but she had also a chronic vaginitis with some endometritis. A curetting was done, and at the same time the vaginal orifice was dilated.

Case 12. A woman, aged 30, had been married sixteen months, and came to see me on account of pain which rendered intercourse impossible. It was referred to the entrance of the vagina. On examination nothing abnormal was found beyond the fact that the vaginal orifice was rather narrow: probably if the patient had been able to persevere for a time in spite of pain the difficulty would have disappeared. Dilatation was done by means of vaginal specula.

Case 13.—The next was a young woman of 25, married a year and a half. Early attempts at intercourse having proved painful (though possibly not more than normally), she had come to fear it, and evidently it had remained in abeyance: for on examination the hymen was found practically intact.

Case 14.—This was another patient who had been married only a short time, namely 6 months. She was 28 years of age, and said that intercourse had been painful from the first. Examination showed the presence of red and inflamed hymeneal caruncles, which were very sensitive to touch. Removal of the caruncles was advised.

Case 15.—The last of this series was a young woman of 23, married 4 years. She had dyspareunia, which she said took the form of pain "quite internally" whenever she had intercourse. The cause was found to be connected with the appendages, as the tubes and ovaries on both sides were prolapsed backwards and exceedingly tender, though there was no abnormal enlargement. On rectal examination, pressure high up against the anterior rectal wall produced the same kind of pain. Under anaesthesia an attempt was made to push the tubes and ovaries up out of the pelvis. Afterwards I lost sight of her, but it would probably have been a suitable case for operative treatment, namely slinging up the ovaries behind the uterus.

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(2) J. Marion Sims. "On Vaginismus." Trans. Obstet. Soc. of London, Vol. iii. for 1861, p. 356.

(3) W. Schnezerieff. "On Vaginismus (Dyspareunia of Dr. Barnes)." Trans. Obstet. Soc. of London, Vol. xvi. for 1874, p. 187.

(4) E. H. Kisch. "Sterilität des Weibes." 2nd Ed. Vienna and Leipzig, 1895, p. 186 *et seq.*

(5) Ellice McDonald. "Sterility in Women." New York Med. Jour., December 23 and 30, 1911.

(6) E. H. Kisch. *Op. cit.*, p. 190.

# CHAPTER VI

## Primary Sterility: A. Congenital Sterility: Malformations

### Malformations and Sterility

Among the 530 cases of sterility in Tables IV., V., and VI., there were 10 cases, or about 2 per cent., in which malformations were present and could justly be regarded as the causal condition. Some of them will be related under their appropriate headings.

Clinically, malformations in their relation to sterility may be divided into two classes: 1, those that prevent intercourse: 2, those that allow intercourse but do not allow of conception. We will consider the two classes in succession.

#### 1. Malformations that prevent Intercourse

For the purpose of intercourse, a vagina is necessary, whatever may be the condition of the other organs. Owing to errors of development, the vagina may be absent, or its orifice may be closed; or the vagina may be present and patulous, but it may be so narrow, either at the entrance or higher up, that intercourse is not possible.

*Absence of the Vagina.*—As a rule, when the vagina is absent the uterus is under-developed. I recorded two such cases (1) among other cases of malformations that I had seen from time to time; and most of the illustrative cases related in this chapter are quoted from the paper in question.

Case 16.—*Absence of Vagina: Hernia of an Infantile Uterus in the Left Inguinal Canal.*

I saw at the Prince of Wales's General Hospital, Tottenham, a single woman, aged 22, who complained of primary amenorrhoea, and of a swelling in the left inguinal region that felt like an omental inguinal hernia. On inspection of the vulva there was no trace of a vaginal orifice, and on rectal examination neither vagina nor uterus could be felt. The girl was engaged to be married. She was admitted for operation, and I first made a dissection to see if there were a vagina, but, after reaching a depth of about 2 inches between the urethra and rectum, I could find no evidence of a vagina, and therefore desisted. Turning to the hernia I found a large hernial sac, whose inner margin was so extensive that one could hardly speak of it as having a neck; the contents of the sac consisted of an infantile uterus; the left round ligament was short and unusually stout, and it appeared to have played a part in drawing the uterus into the canal. I divided the round ligament, returned the uterus into the abdomen, and closed the large gap in the inguinal canal. It was necessary to explain to the patient and to her fiancé that marriage was out of the question.

Case 17.—*Absence of Vagina: Rudimentary Uterus and Ovaries: Horseshoe Kidney in the Pelvis.*

In September, 1904, a single woman, aged 20, came to the Hospital at Tottenham, saying that she had never menstruated. She stated that an operation had been done at the University College Hospital for the removal of a tumour. On inspection of the vulva there was no trace of a vaginal orifice, but on rectal examination a large firm swelling was felt impacted in the pelvis. She was admitted for operation, and on opening the abdomen it was at once evident that the swelling was a horseshoe kidney occupying the hollow of the sacrum. The uterus was quite rudimentary, consisting of little more than the meeting-point of two unusually long Fallopian tubes. On tracing these outwards the ovaries were found, long and narrow as in the foetal stage, and placed well above the brim of the pelvis. There was no trace of vagina. It was evident that at her previous operation this condition had been discovered, and the abdomen closed without doing anything—a course which I had no alternative but to follow.

Among my private notes are the particulars of the following case.

Case 18. *Absence of the Vagina: Uterus Bicornis: double ovarian dermoid.*

I saw with Dr. A. C. Cadman a single woman aged 31. She had never menstruated, but since the age of 14 she had had feelings every month, "as if menstruation were coming on," namely pains across the lower abdomen and a sensation of bearing down. On examination, the breasts were small but otherwise well-developed: the pubic hair was abundant, and the vulva normal in appearance. There was no vaginal orifice, but the skin in this situation could be depressed about an inch. A few weeks later, at the Chelsea Hospital for Women, an examination was made under anaesthesia, and this note was made: "Both ovaries feel enlarged: the uterus is a mere knob connecting the tubes: a dissection between the urethra and rectum carried up for some distance showed no trace of a vagina." The attempt to establish a vagina was therefore abandoned. A year later she was married; no intercourse was possible: but she stated that "she had her feelings like other people." Nearly two years later, rectal examination showed considerable enlargement in the position of the right ovary, and she had much pain on the right side. Abdominal operation was undertaken, and revealed the condition of uterus bicornis unicollis: the right fundus was larger than the left. The right ovary was converted into a dermoid cyst the size of an orange; it contained hair and sebaceous matter. On the left side was a multilocular cyst whereof one loculus had dermoid contents. Double ovariotomy was carried out.

Fig. 1, which is drawn from a sketch made at the time, explains the impression gathered at the time of the first examination, that the uterus was a mere knob connecting the tubes.

In some cases, however, the uterus is sufficiently developed to undergo the periodical monthly changes associated with menstruation; and attempts have been made to make a vagina by dissection. Such attempts are nearly always doomed to failure, even from the point of view of permitting married life.

From the point of view of sterility, these cases are definitely incurable.

*Atresia of the Vagina.*—This means that the orifice of the vagina is completely closed, so that there is no communication whatever between the vaginal canal and the outside. The term is sometimes used inaccurately in medical literature, and made to include cases in which the vaginal orifice is very much narrowed. The correct term for this condition is

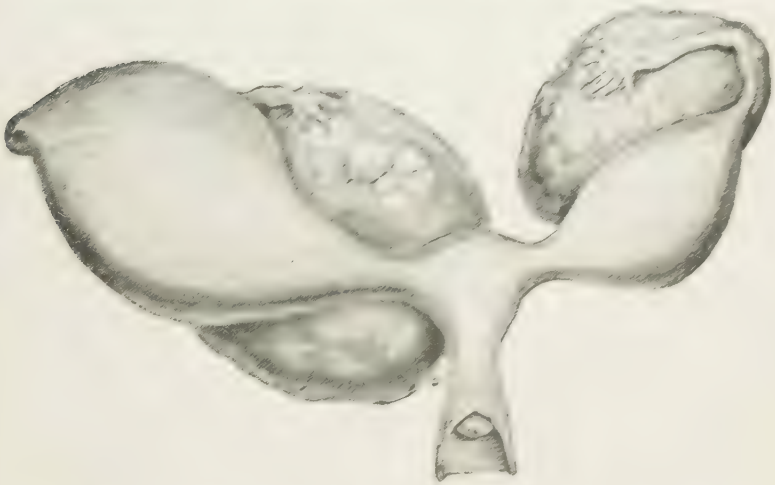

FIG. 1.—Uterus bicornis, with bilateral ovarian dermoids.

*stenosis of the vaginal orifice.* Cases of atresia are less uncommon than those of absence of the vagina. They have been described in text-books as "imperforate hymen;" but researches have shown that the obstructing septum is not formed by the hymen but lies just above it and is the result of the fused Müllerian ducts not reaching the surface. The membrane is thin and easily divided, and so the patency of the vagina can be established. If this be done early, before the phenomena of hæmatocolpos, hæmatometra and hæmatosalpinx have led to morbid

changes in the walls of the genital passages, pregnancy might still be possible. But if those changes have come about, or infection takes place at the time of opening, sterility must result.

Case 19. *Atresia of the Vagina: Hæmatocolpos: Incision: Infection: Pyosalpinx.*

A girl, aged 17, was admitted to the hospital as a case of retained menses: before admission the membrane had had a small incision made into it. A small incision does not allow free escape of the thick retained fluid, but it readily allows the entrance of pathogenic organisms, which find in the thick blood an ideal culture medium: this is what had happened. The girl had a high temperature and the vaginal contents were purulent. A free incision was made, and the vagina was irrigated, but as the temperature kept up, a further examination was made, and it was found that the tubes were greatly distended. The abdomen was opened, and the tubes, which had become converted into pus-sacs, were removed. After a somewhat stormy convalescence the patient got well.

In the next case menstruation had never been attempted.

Case 20. *Atresia of the Vagina: Absence of Menstruation.*

Some years ago I saw a girl at the St. Marylebone Dispensary; she had not menstruated, and there was vaginal atresia. She was admitted to the Tottenham Hospital, and on incising the occluding membrane a small quantity of whitish fluid escaped: it was composed of epithelial débris and cholesterin crystals.

Commenting upon these cases I said in the paper in which they were reported:

"In a case like the first, if all went well, treatment would render normal menstruation and marriage possible; in the second it would permit of marriage but not necessarily menstruation. I doubt whether in either case pregnancy would follow, for I have never heard of a case in which a patient who had been operated upon for vaginal atresia had become pregnant. I have an impression that the changes brought about in the uterus as the result of retention of the

menses would be unfavourable to conception ; but if any of my readers have ever known of a case of pregnancy following. I should be grateful for an account of it."

Shortly after the paper appeared a medical *confrère* kindly wrote and gave me particulars of a case in which pregnancy followed an operation for the relief of vaginal atresia.

*Stenosis of the Vagina.*—The vagina may be too narrow, either at its orifice or along its whole extent, to admit of intercourse. This is usually congenital, when it is due to under-development. But it may be traumatic, resulting from some accidental injury such as might occur from the breaking of a chamber-utensil under the patient ; or it may follow operative interference with the vaginal wall, when the narrowing is brought about by cicatricial contraction.

Traumatic vaginal stenosis comes strictly under the heading of " acquired sterility ; " but it is convenient to consider here all cases of stenosis.

Case 21.—Some years ago I saw a patient aged 44, who had been married 18 years. She stated that intercourse was possible only for the first year ; after that she underwent Whitehead's operation for haemorrhoids, and one can only conclude that the recto-vaginal septum was injured, and that some extensive infection must have occurred, because there was no history of any vaginal operation or treatment. Be that as it may, she was not able to have intercourse afterwards, and when I saw her, the vagina was nearly occluded by cicatricial contraction. At that time the vaginal condition was a secondary matter, as she had a large intra-abdominal abscess, of undiscovered origin, which I opened and drained. But two years later, as the vaginal condition was causing much domestic unhappiness, I endeavoured to restore the patency of the vaginal canal. The result was, however, unsatisfactory.

Sterility due to vaginal stenosis is, of course, potential ; and once the mechanical difficulty is overcome, pregnancy may occur, provided there is no under-development of the uterus and ovaries.

*Rigidity of the Hymen* is a form of stenosis. It varies greatly in degree, from a slight rigidity that could readily be overcome during coitus if the patient were not deterred by pain, to such a degree of toughness and resistance as can only be dealt with by dividing the membrane with a knife under anaesthesia.

In some cases the difficulty encountered at the first attempt at intercourse has so discouraged a young married couple that the attempt has not been renewed; and because the husband and wife have been too shy or too ignorant to seek advice, years have been allowed to pass, filled with ineffectual longings for the child that both desired.

The immediate result of the difficulty may be more tragic, as in a case related by Lefort and quoted by Kisch (2). Lefort was called one night in Paris to a young Russian married couple who had proposed to spend their honeymoon in that city. The husband had shot himself through the heart because a rigid hymen had prevented the fulfilment of the marriage rite.

### Pregnancy and Labour in Cases of Stenosis of the Vagina and Unruptured Hymen.

Although stenosis of the vagina, of a degree sufficient to prevent complete intercourse, necessarily leads to sterility in the vast majority of cases, there are nevertheless many curious instances on record where pregnancy and labour have occurred. This possibility is not only very instructive clinically, but also very important from the medico-legal standpoint; and I have thought the subject to be of sufficient interest to justify my devoting a special section to it.

I have collected such cases as I have been able to trace in medical literature, and appended them as a bibliography of the subject at the end of this chapter.

Some of these cases I will now relate briefly. The reference to the authors quoted will be found in the bibliography (3).

*Maher* in 1897 collected over 200 records of labours with vaginal atresia, transverse septa, and cicatricial stricture. I am not here concerned with the obstetrical problems presented by these cases during labour, but rather with the striking fact that conception could occur.

*Heywood Smith* reported a case of delivery through an imperforate (*sic*) vagina. The patient had been seen, before conception took place, by Edis, who found a vaginal cul-de-sac, 1½ inches long; there was no sign of an orifice at the bottom of the cul-de-sac, and he noted that the urethra was widely patent. It is a point of great interest that in this case the patient menstruated regularly and freely from the age of 13, the flow being accompanied by clots. When her confinement occurred she had been married 10 years. The husband stated that generally there was no difficulty during coitus, but sometimes it produced great pain and it appeared that he entered a narrow pipe. Heywood Smith was of opinion that this pointed to the fact that the urethra was used during intercourse and accounted for its abnormal patency.

When labour came on, he cut through the whole thickness of the vaginal roof with one cut of a pair of scissors, and came at once on to the child's head. He gradually stretched the opening and was able to deliver a live child with the forceps. The mother recovered.

*Fancourt Barnes* also reported a case of labour with atresia (*sic*) vaginae. This patient also had been seen by Edis shortly after marriage: there was a short cul-de-sac, scarcely an inch long, in place of the ordinary vagina, and a mere pin-hole aperture was

detected in the upper portion. There is no note as to the condition of the urethra. The patient evidently conceived soon after marriage, as she was only 21 at the time of labour. The case differs from the preceding one in that there seemed to be a thick septum between the cul-de-sac and the cervix uteri; and Barnes had to dissect upwards for about 2½ inches before the presenting head could be felt. The child was delivered alive with forceps and the mother made a good recovery.

*Isaac Taylor*, of New York, reported a case under the heading of "complete congenital atresia of the vagina: pregnancy: safe delivery: child, living: treated by the tearing process." The case was very similar to Heywood Smith's; but the fundus of the cul-de-sac was so thin that it was possible to scratch an opening through with the finger nail, no cutting being required.

It will be noted that all three authors describe their cases as "atresia." But unless we assume that insemination took place through the urethra—and this is a large assumption—it is evident that there must have been some opening, however small, in the vaginal vault, through which spermatozoa were able to reach the cervix. And if this be so, the cases were all instances of stenosis, and not of atresia. The demonstration of such an opening was possible in a case related by *Cazeaux*. In 1837 a young woman, advanced to the last month of gestation, presented herself at the clinic of the Faculté. On vaginal examination the finger was arrested at a depth of 1½ to 2 inches by a perfectly smooth septum, in which it could detect no sensible opening. On pushing in a speculum, a small opening was detected towards the upper third and right portion of this partition, through which a few drops of sero-purulent fluid were oozing. On passing a probe through, it

entered a kind of posterior chamber, formed by the upper wall of the vagina. Evidently there was here an "hour-glass contraction" about the middle of the vagina. The delivery was effected spontaneously, and it was found later that the septum had been split into three distinct pieces.

Cazeaux quotes several cases of marked stenosis of the vagina; thus *Moreau* observed a young woman in the fourth or fifth month of pregnancy, in whom the vagina was so contracted that it barely admitted the barrel of an ordinary writing-quill. *Portal* stated that a young girl in whose vulva there was only a small opening for the passage of urine, and whose menses were always discharged by the anus, became pregnant; yet the small opening enlarged sufficiently during the latter stages of gestation, and more particularly during the travail, to permit of a spontaneous termination of the labour. One cannot but think that in this case the "small opening" was in reality a greatly constricted vaginal orifice.

*Rossi* reported that, having been called to a woman in labour, he discovered a total absence of the external genital organs. At first he supposed that there was a retention of the menses, and, under this impression, made an incision about two inches long in the direction of the vagina; when, instead of the menstrual blood, he encountered a male child, which escaped through this opening, and lived but seven hours after its birth. While searching where the fecundation could have taken place, he discovered, after having interrogated the husband, a small orifice, near the sphincter ani and at the internal part, which would scarcely admit a fine probe. Cazeaux gives no references for the above three cases.

*Plenck* stated that, being summoned to a woman in labour, he found the vagina so contracted that the little finger could not be introduced at all. Never-

theless, this canal was sufficiently dilated by the end of 18 hours, and the child's expulsion took place without producing any laceration of it, or of the external genital parts.

*Merriman* stated that the labour terminated spontaneously in 36 hours, in a case where the introduction of the finger was barely possible; but the patient died on the third day, and a small laceration of the vagina was found at the post-mortem examination.

*Spiegelberg* says, "I have seen a case of pregnancy in a woman whose vagina had been intentionally closed in its urethral portion on account of injury to the bladder, and where an opening no larger than a pin's head remained. The possibility of insemination *per urethram* could be excluded."

*Houghton* was called to the confinement of a woman aged 25: she had had one child and was then attended by a midwife, who allowed the head to remain "half-born" for 12 hours. When the patient got about again she found "that the functions of the parts could not be performed as before." Nevertheless she became pregnant. On examination the vaginal orifice was obstructed by a dense membrane: there was a small orifice anteriorly, which would not admit the tip of the first finger. By steady pressure the membrane yielded until the orifice admitted three fingers, after which the membrane was divided, and the labour satisfactorily concluded.

*Oakman* attended a girl in labour; she was only 15 years old, and her husband was 16. The hymen was complete and sickle-shaped, with just sufficient space to pass the finger above its concave border. Labour was spontaneous, and not even delayed; the hymen gave way when pressed upon by the child's head.

*Carter*, of Montreal, communicated to *The Lancet*, through J. Coward, of Islington, the following un-

usual case. He attended a woman of 30, in labour with her second child. She had had a very bad first confinement. He found an extensive tear of the perineum, "the vagina and rectum having been made one sulcus." Following the direction of the vagina, the finger was arrested, about 3 inches from the vaginal orifice, in a pointed cul-de-sac; withdrawn about half an inch and directed backwards, it entered the rectum, the anterior edge of which was here sharp and thin. The os uteri could not be detected. During a pain, fluid was felt behind the fleshy septum: with a bistouri the septum was divided, when liquor amnii came away, and labour was concluded normally. A probable explanation of this case is that the patient had a complete rupture of the perineum, with a tear extending high up the rectovaginal septum. The intact portion of the vagina was therefore very short; and when the examination was made, the external os was already dilated and its place occupied by the bag of membranes; hence "the os uteri could not be detected."

*Burgess* was called to a single girl in labour. She stated that "connection" was painful and difficult. The finger came on a tough resisting membrane: there was no blood nor mucus seen. With a speculum, a complete hymen was discovered, with a median raphe; at the junction of the middle and anterior thirds of the raphe a small hole, about the size of the urethra, was then observed, through which a little blood flowed out. Burgess thought he must have made the hole during the examination, as there had been no previous haemorrhage. The membrane was divided with a knife, and labour completed.

*Francis* recorded a case in which the final exodus of the head was impeded by a toughish membrane,

which was stretched tensely across the vagina. The confinement was natural. The condition was such that the patient, who was aged 30, had expressed the view, after four months of married life, that "pregnancy was impossible."

It would be possible to narrate a great many more from the list of those recorded; but the above will suffice for our present purpose, which is to show that a stenosis of the vagina sufficiently pronounced to prevent the introduction of the penis into the vagina does not necessarily make conception impossible; and also that, apart from a pathological stenosis, the sexual act may be so incomplete as to leave the hymen unruptured, and yet pregnancy may occur. This fact has an important corollary, to which we may call attention here, although we are not dealing with sterility and impotence in the male. Some of the cases where pregnancy has occurred with an intact hymen and without intromission of the penis, have been cases where the woman was normal and the man was impotent and unable to obtain an erection. Therefore impotence in a man is not an insuperable bar to fatherhood; and *Chance* even reports two cases where the total destruction of the penis was not a cause of impotence.

It must be remembered, however, that the above cases are exceptional; and that, generally speaking, stenosis of the vagina and rigidity of the hymen, of a degree sufficient to prevent intercourse, are nearly always associated with sterility: and that if the patients whose cases have been related, were seen in the non-pregnant state, we should be justified in giving a very unfavourable prognosis, unless steps were taken to remedy the defect. Some of the cases would come into our category of primary congenital sterility; and those in whom the defect was the result of a confinement would be classed

among the cases of secondary sterility which will be considered later.

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Note. The above Bibliography does not claim to be complete and exhaustive. A fuller list is to be found in the Surgeon-General's Catalogue, U.S.A.

## CHAPTER VII

### Primary Sterility: A. Congenital Sterility (*contd.*)

#### Malformations and Sterility (*contd.*)

In the previous chapter we considered those malformations that lead to sterility by preventing intercourse. We now pass on to

2. *Malformations that allow of intercourse, but cause sterility.*

In these the defect is in the ovaries, Fallopian tubes, or uterus.

*Absence of the Ovaries.* – In the chapter on pathological classification I said that absence of the ovaries is very rare, and, indeed, is found only in association with other gross malformations. Every fully formed human being has either ovaries or testes. In practice, and apart from the removal of ovaries by operation, if a person presumed to be a woman has no ovaries, the sex has been mistaken; the person is actually a man and will be found to have testes, even though the external genital organs may be of the female type. I recorded such a case (1) which is sufficiently germane to our subject to be quoted here.

Case 22.– *A Case of Androgyny, the patient living as a married woman.*

Some years ago a woman, aged 28, who had been married ten years, came to the out-patient department, complaining of a swelling in the left inguinal region. It felt like an irreducible hernia. A statement to the effect that she had

only menstruated twice in her life led to an examination, when I found that the vagina was shorter than usual, and ended above in a smooth cul-de-sac, in which there was no trace of a cervix. Bimanually there was no sign of a uterus. The vulva was quite normal in appearance, and the breasts were fairly well developed. She was admitted, and the "hernia" was operated upon. It was soon evident that it was not a hernia of bowel; in fact, there was no true peritoneal sac, but a glandular structure was discovered, extra-peritoneal in position. This was removed, the peritoneal cavity was opened, and a finger introduced. There was no uterus, the peritoneum passing down from the back of the bladder on to the rectum, as in the male; and on the right side at the brim of the pelvis, a glandular structure was felt, like the one in the left inguinal canal. The hernial orifice was closed, and subsequent microscopic examination of the gland removed showed that it had the typical structure of the testes. The patient was an example of androgyny. The case had undoubtedly great medico-legal possibilities, but it seemed both unnecessary and undesirable to allow of their development, and the patient left the hospital as "she" had entered it—a "woman."

*Under-development of the Ovaries.*—This condition, which is also rare, is always a part of a defective development of the genital organs. If, on examination, the uterus be found to be rudimentary, the ovaries may be presumed to be under-developed also; but it is obvious that the diagnosis can only be made with certainty when the abdomen has to be opened for any reason. Such a case is reported in the preceding chapter (p. 53) under the heading of "Absence of the Vagina; Rudimentary Uterus and Ovaries: Horse-shoe Kidney in the Pelvis."

One ovary may be rudimentary, while the other is normally developed, and pregnancy may then occur as usual. I met with such a case, which is of sufficient interest to be quoted here. Incidentally, it illustrated the curious point, which also comes out in the case above referred to, that when the ovaries are rudimentary, the kidneys are apt to

occupy a pelvic position; and if only one ovary is rudimentary, the corresponding kidney is likely to be in the pelvis.

Case 23.– *Uterus unicornis: Rudimentary right ovary; pelvic right kidney; normal pregnancies.*

In October, 1906, I operated on a woman, aged 34, on account of procidentia and what appeared to be a right ovarian tumour. She had had three children, the confinements being normal. On opening the abdomen the tumour was found to be the right kidney fixed in the hollow of the sacrum; the left kidney was in the normal position. The right side of the uterus was undeveloped, only a rudimentary tube and ovary being present; the tube was connected with the main part of the uterus by means of a slender cord-like structure, the rudimentary horn. The right round ligament was also quite rudimentary, but the left was unusually well developed, so I used it to sling up the uterus to the abdominal wall. Later on the patient became pregnant and again had a normal confinement. Dr. W. H. Paine, who attended her, wrote to me about it, and mentioned that he had been puzzled by a firm swelling in the hollow of the sacrum, which did not, however, interfere with labour. I was able to tell him what the swelling was.

*Atresia of the Fallopian tubes.*—Apart from occlusion of the tubal ostium and the isthmus tubae as the result of pyosalpinx, which will be considered later, the tube is sometimes occluded in some part of its course by conditions that may be described as congenital, inasmuch as they may occur during foetal life; though they are probably not in a strict sense developmental. Naturally this defect cannot be diagnosed by ordinary examination, and is only revealed when the abdomen is opened. I have met with several cases of this kind, of which the following is a typical example.

Case 24.—*Congenital Occlusion of the Fallopian tubes.*

A married woman, aged 23, was operated upon for a fixed retroversion. On opening the abdomen, the fundus was found adherent in the pouch of Douglas. Both tubes presented

a remarkable appearance, as if they had been cut across; about $1\frac{1}{2}$ inches from the uterus each tube had a rounded, closed-up end, resembling the tip of the appendix, and further out, connected with the corresponding ovary, were the remains of the fimbriated extremity. I concluded that the condition was brought about by the formation of intraperitoneal bands, perhaps in foetal life. I made an artificial ostium at the end of each tube (salpingostomy), but I do not know if pregnancy ever occurred, for I was unable to trace the patient later on.

*Atresia of the Os Externum or Internum.*—It is very doubtful whether this ever occurs as a congenital condition. Certainly the cases met with in practice are nearly all acquired, as the result of some trauma, accidental, operative, or chemical. It will therefore be more suitable to defer their consideration until we describe the causes of acquired sterility.

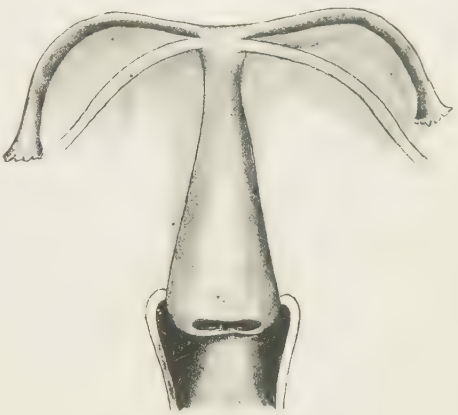

Fig. 2.—Rudimentary Uterus.

*Under-development of the Uterus.*—Three grades of under-development can be recognized. The first is the "rudimentary uterus," shown diagrammatically in Fig. 2. There is practically no fundus, and sometimes the whole uterus feels like a small knob. The case reported on page 53 presented this type of uterus. Patients with this malformation do not menstruate. The second grade is the "Infantile Uterus;" the body of the uterus is small, in fact smaller than the cervix (Fig. 3). This is a normal condition at an early stage of development and the fault is that the development is arrested at this stage.

The sound passes 1¼ to 1½ inches. Menstruation is either completely absent, or it starts late and occurs scantily and infrequently. Not uncommonly the whole development of the patient is backward: the breasts remain childish and the pubic hair is scanty. The following is a typical instance.

Case 25.—*Infantile Uterus: Primary Amenorrhoea.*

A single woman, aged 23, came to the out-patient department at the Prince of Wales's Hospital, Tottenham. She stated that she had never menstruated. The vulva was well developed, but the pubic hair was rather scanty, and the breasts were childish. I admitted her for examination under anaesthesia, when it was found that the uterus was infantile in shape and quite small, the sound passing in only 1½ inches.

Among my private cases are the following examples:

Case 26.—This was a woman, aged 33, married 9 years. Her general health was very good, but she had never menstruated. She had had no difficulty in intercourse. On examination she was well-developed: the breasts were full, but appeared to consist rather of fat than of glandular tissue. The abdominal wall was fat, the pubic hair normal. The vulva had the normal appearance, and the vagina was of normal length and width. The uterus was infantile, the whole length of the cavity being only about 3 c.m. (1¼ inches).

Case 27.—The patient, aged 29, had been married 5 years. Menstruation had always been scanty and irregular, with intervals as long as 3 months. For two years there had been no menstruation at all, though she had attacks of suprapubic pain at intervals of three to four weeks. The general health was good. She was rather stout, and the breasts were childish in their development. Vulva and vagina normal. Uterus infantile, with a cavity measuring about 3·5 c.m. (1½ inches).

Case 28.—A woman, aged 32, who had been married 4 years, came to see me on account of six months' amenorrhoea. Before that, menstruation was irregular and infrequent, and had come on only about a dozen times in 4 years. Before marriage it was fairly regular, lasting about a week. The general health was good, but she had attacks of irritability, depression, and uncertainty of temper. She had noticed

this feature previously when the periods were in abeyance. She was, unlike the two previous cases, thin; the breasts were small and childish. The vulva was normal, the vagina rather small, both in length and width. The uterus was undersized, and felt of the infantile type; but its length could not be measured, as the cervical canal was so narrow that the sound could not be passed.

In the third grade, which may be described simply as "under-development of the uterus," the body and cervix present the normal relative lengths, but the whole uterine canal measures only from $1\frac{3}{4}$ inches to $2\frac{1}{4}$. Menstruation commonly starts late, at the age of 16 to 18, and is apt to be scanty and irregular. As in the more marked degrees of under-development there is a notable tendency to the deposit of fat. The following is from my case-papers.

Fig. 3.—Infantile Uterus.

Case 29.—Patient aged 35, married $9\frac{1}{2}$ years. Menstruation started at 15 and was regular, but never very much. At the age of 21 she went to Finland, and menstruation never came on again, except 3 times in her 33rd year. She got stouter after the age of 21. The breasts have much fat, but little mammary tissue; clitoris and labia minora small; labia majora normal. Vagina normal length; the uterus is very small, retroverted, with a pinhole os.

Several observers, such as Mme. Boivin, Dugés, Lumpe, and Pfan have expressed the opinion that development of the uterus from the infantile to the sexually-mature condition is sometimes late and slow; so that women in whom an infantile uterus has been discovered may start menstruation later

on, and even conceive. Kisch (2) relates a case of a woman who consulted him on account of amenorrhoea and sterility. He found an infantile uterus, and told her, as did several other gynaecological authorities, that she must give up the hope of pregnancy; nevertheless after 10 years of sterile married life she gave birth to a healthy child.

In this connection the following case is instructive.

Case 30.—*Under-developed Uterus with Amenorrhoea: later development with re-establishment of menstruation.*

In the summer of 1911 I saw a doctor's daughter, aged 19: she had had amenorrhoea since Christmas, 1909, and had previously menstruated slightly for a few months. Examination under anaesthesia showed a markedly under-developed uterus; it felt small, and the sound passed in $1\frac{3}{4}$ inches. I saw her again 5 years later; menstruation had been going on regularly for 2 years, the menstrual flow not very much, but lasting three to four days. She had been married six months. On examination, the uterus felt quite normal in size, and I shall not be surprised if pregnancy occurs.

Cases like this and the one related by Kisch, must, however, doubtless be regarded as comparatively rare exceptions; and from the point of view of the prognosis of sterility, it is certainly true that with rudimentary uterus the prognosis is hopeless; with infantile uterus it is very bad, and with the lesser degrees of under-development it is bad. Consequently it is wise to warn patients and their friends that pregnancy is unlikely to occur; for it is much better that a woman should resign herself to the inevitable and possibly be agreeably disappointed, than that she should constantly be hoping for a result which is highly unlikely, and live in a state of alternating hope and disappointment, hoping every month that the period will be suppressed and disappointed every month by its appearance.

*Anteflexion and Stenosis of the Uterus.*—Acute anteflexion of the uterus, with stenosis of the cervical

canal, is nearly always a congenital or developmental condition ; and it is properly a variety of malformation. It is therefore correct that we should consider it here, rather than in the section on displacements, although in gynaecological text-books it is commonly described among the displacements of the uterus. The relation of anteflexion to sterility has been the subject of many contributions to medical literature. Its importance has been magnified by some and minimized by others. Thus at one extreme we find Graily Hewitt (3), who considered anteflexion as a factor of the highest importance in the causation of sterility. At the other extreme, Hühner (4) takes up the position that the importance of anteflexion has been greatly exaggerated. He says "A conical os is often found in cases of sterility, and the same may be said of abnormal length of the cervix. But time after time have I found live spermatozoa in the fundus in spite of the conical cervix or an abnormally long one. We may therefore say that while a conical cervix is very often found in cases of sterility, and is the cause of sterility in many cases, we cannot in any particular case blame it until we have investigated whether it in fact causes a barrier to the ascent of the spermatozoa or is in such a position on account of its length or shape that the spermatozoa during coitus fall to either side of it, and not on the os. This is the supreme value of the cervix-test for sterility over all other methods."

He also observes, "I have found that acute anteflexion and a narrow os seems to be the rule in unmarried females, whether they will be sterile or not. It is only after childbirth that the anteflexion tends to disappear, as well as the narrow os."

In order to test this statement by my own experience I have examined my case-papers, noting the presence or absence of anteflexion in unmarried girls and

women up to the age of 35. Above this age there was a large percentage of abnormal conditions, especially tumours, which rendered statistics as to the condition of the uterus valueless.

The results of my analysis are shown in Table VII.

TABLE VII. ANALYSIS OF THE CONDITIONS OF THE UTERUS IN UNMARRIED GIRLS AND WOMEN OF VARIOUS AGES.

| Condition of the uterus. | 15 & under. | | 16 to 20. | | 21 to 25. | | 26 to 30. | | 31 to 35. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Normal .. | 7 | 100·0 | 26 | 59·1 | 73 | 58·9 | 92 | 59·8 | 75 | 67·6 | 273 | 62·0 |
| Anteflexion | — | | 13 | 29·6 | 30 | 24·2 | 24 | 15·6 | 21 | 18·9 | 88 | 20·0 |
| Retroversion | — | | 3 | 6·8 | 16 | 12·9 | 36 | 23·3 | 15 | 13·5 | 70 | 16·0 |
| Under-development.. | — | | 2 | 4·5 | 5 | 4·0 | 2 | 1·3 | 0 | 0·0 | 9 | 2·0 |
| Total . | 7 | 100·0 | 44 | 100·0 | 124 | 100·0 | 154 | 100·0 | 111 | 100·0 | 440 | 100·0 |

If the figures shown in this table can be regarded as a reliable indication of the conditions present in unmarried girls and women in England, it is evident that anteflexion is by no means the rule, since in 440 cases examined it was present in only 1 of every 5. But as I have previously pointed out, the proportion of abnormal conditions is certain to be higher among a group of cases of patients who have come for advice owing to some pelvic trouble, such as dysmenorrhœa, than it would be among the population at large. We may therefore infer quite safely that, in general, anteflexion occurs with even less frequency than one in every 5 cases, at any rate in England. The proportion may be higher in America.

The figures bring out an interesting and important point in that they support the view that there is a tendency for anteflexion to become corrected spontaneously as patients get older; thus, while among girls up to the age of 20, anteflexion was present in nearly 30 per cent., the percentage in the

three succeeding quinquennial periods was respectively 24·2, 15·6, and 18·9.

Similarly, while making due allowance for the smallness of the numbers, the proportion of cases of under-development shows a progressive decline from 4·5 per cent. up to the age of 20, to 4·0 per cent. in patients of 21 to 25, and 1·3 per cent. in those of 26 to 30; whilst among patients over 30 none were met with. As far as they go, then, the figures support the view quoted previously (pages 73 and 74), that in some cases of under-development, development is slow and late and that an examination of the same patients at a subsequent date may show a normally developed uterus, which may even become pregnant.

A short digression may be allowed on the relation between anteflexion and dysmenorrhoea. It is a common thing, when eliciting histories, to find that patients with anteflexion menstruated painlessly in their earlier years, and that by degrees the pain becomes more severe. But this goes on only up to a certain point, and then an inverse tendency sets in, menstruation becoming gradually less painful. It is a rare thing to meet with an unmarried women over 40 years of age who has an anteflexion and suffers from dysmenorrhoea. When analysing my cases I distinguished between those patients who had dysmenorrhoea, and those who had not, and the figures are interesting as they corroborate the above observations. The patients with anteflexion suffered from dysmenorrhoea in the following percentage of cases :—

| | | | | |
|---|---|---|---|---|
| Up to the age of 20, | dysmenorrhoea | in | 61 | per cent. |
| From 21 to 25 | ,, | ,, | 80 | ,, |
| From 26 to 30 | ,, | ,, | 75 | ,, |
| From 31 to 35 | ,, | ,, | 43 | ,, |

To return to the subject of anteflexion in its relation to sterility, we may in the first place regard

it as established that acute anteflexion is not the usual but an abnormal condition, even in young women.

In the second place I regard it as certain that acute anteflexion and stenosis of the cervical canal are important factors in the production of sterility. In Tables IV. to VI. (pages 34-36) it is shown that one or both of these conditions were present in 24 per cent. of my cases of sterility, forming, indeed, by far the largest group. The younger the patient, the greater the part played by this factor. In Table IV. we see that the proportion of cases of anteflexion falls strikingly as the age increases, as follows :

Anteflexion and stenosis were present—

| | | | | |
|---|---|---|---|---|
| In | 37·2 | per cent. | of patients | up to the age of 24 |
| ,, | 34·2 | ,, | ,, | ,, 25 to 29 |
| ,, | 25·8 | ,, | ,, | ,, 30 to 34 |
| ,, | 26·2 | ,, | ,, | ,, 35 to 39 |
| ,, | 7·3 | ,, | ,, | ,, 40 and over |

The decrease is, of course, partly due to the fact that as age advances other conditions supervene, especially tumours and displacements, which have the effect of reducing the proportion of cases of anteflexion.

It would be incorrect to say that a patient with anteflexion and stenosis cannot become pregnant ; and still less can this be said when there is anteflexion without stenosis. For, in the first place, there is a tendency, as we have seen, for the anteflexion to become corrected spontaneously in certain cases ; and in the second place, a patient may conceive while the anteflexion is present. I saw a patient, aged 31, married a year and a half ; acute anteflexion was present. She was very anxious for a child, and I advised treatment by dilatation and stem. For various reasons the operation was post-

poned, but she became pregnant 8 months after I had seen her.

It is, however, undoubtedly true that anteflexion and stenosis are unfavourable to conception ; and that in a certain proportion of cases pregnancy follows the correction of the condition. The younger the patient when the operation is done and the shorter the time that has elapsed since marriage, the better the result. The following are some examples :—

Case 31.—I first saw this young woman, aged 29, when she was single, her complaint being severe dysmenorrhoea, coupled with irregularity and infrequency of the periods. She had an acute anteflexion, with stenosis of the cervical canal. As medicine gave only partial relief, dilatation and straightening of the uterus was carried out in October, 1906. She was married in December, 1907, and had a normal confinement in April, 1909.

Case 32.—This was a young woman aged 22 years of age, married 4 months. Menstruation was regular, scanty and painful. On examination the uterus was acutely anteflexed, the cervix was conical with a typical " pinhole os." Dilatation and straightening of the uterus was done in November, 1905 ; she became pregnant in June, 1906, and had a normal confinement in March, 1907. Menstruation was much less painful after the operation.

Case 33.—A patient aged 32, married 12 months, came complaining of dysparcunia and dysmenorrhoea. She stated that during intercourse it felt to her " as if there were some obstruction at the farthest point." Menstruation was regular and free, with severe pain on the first day. The uterus was sharply anteflexed. Dilatation and straightening was done in April, 1905, and the following three periods were practically painless. She conceived in the following August, and when I saw her three months later, there were the signs and symptoms of pregnancy.

Case 34.—This patient was 30 years of age, and had been married 8 years. Menstruation was regular and free, but very painful for the first 2 days. The uterus was acutely anteflexed, and was treated by dilatation and the introduction of an intra-uterine stem, in April, 1915. For two years

menstruation went on regularly, but was much less painful. In April, 1917, she became pregnant, and when I saw her in the following September the uterus was the size of a 5 months' pregnancy.

The mode of action by which anteflexion causes sterility has been variously explained. The simplest explanation would appear to be that, the cervix being turned forward, the semen is discharged against

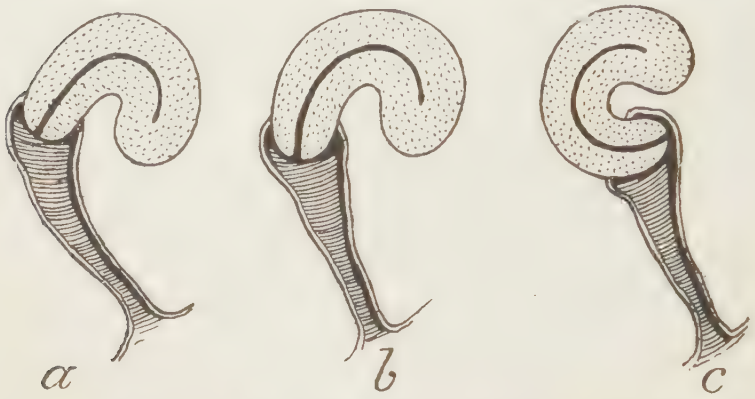


FIG. 4.—Diagram to show three types of anteflexion: (*a*) with the cervix pointing normally backwards; (*b*) with the cervix pointing downwards; (*c*) with the cervix pointing forwards.

its posterior wall and misses the external os. It appears to me further, though I have not found the point discussed in the literature of the subject, that variations in the position of the cervix in cases of anteflexion would account for differences in the facility with which impregnation may take place. Thus, in some cases, the cervix retains very nearly its normal direction, the fundus being bent acutely downwards (Fig. 4*a*): in this type the conditions would be least unfavourable for conception. In other cases, the cervix points more directly down the vagina (Fig. 4*b*), a position which would be more unfavourable than the preceding. In the third

FIG. 5.—Diagram to show the shutting off of the os externum during intercourse in the type of anteflexion shown in Fig. 4*c*.

type, the fundus has nearly its normal direction, but the cervix is bent forwards and almost upwards (Fig. 4*c*), and it would seem almost certain that in this case the cervix would be pressed forwards during intercourse in such a way that the external os would impinge against the anterior vaginal wall, and that the entrance to the cervical canal would be shut off. Fig. 5 is intended to show diagrammatically what would happen during intercourse in the third type of anteflexion.

The degree of stenosis of the external os is another important factor: obviously, the smaller the opening, the smaller are the chances that the semen will make an effectual entrance.

*Sterility in relation to Uterus Unicornis and double Uterus.*

Before leaving the subject of malformations, I may point out that the Uterus unicornis, and the three forms of double Uterus—Uterus septus, bicornis and didelphys—are not necessarily associated with sterility: in fact, the chances of pregnancy seem to be nearly as good in these cases as with

FIG. 6.—Uterus unicornis.

the normal uterus. The principal risk with the one-horned uterus (Fig. 6) is that pregnancy may take place in the undeveloped horn, when it runs the same dangerous course as does a tubal pregnancy.

Many cases of pregnancy in a double uterus have been recorded; but when any form of mal-development is present, the faulty influence may also extend

Fig. 7.—Uterus bicornis, with multilocular ovarian cyst on the left side.

in the direction of diminished ovarian development. Therefore, although the chances of pregnancy seem to be, as I have said, *nearly* as good as with the normal uterus, I do not regard them as quite as good.

Case 35.—In illustration of this point I recall the case of a single woman aged 26, whom I saw in 1904; I diagnosed a left ovarian cyst. On opening the abdomen, I found the condition depicted in Fig. 7; a left-sided multilocular ovarian cyst was closely attached to the left horn of a bicornute

uterus, and thus masked the fact of the double uterus, in much the same way as in Case 18 (Fig. 1). Left ovariotomy was carried out. The following year the patient got married. I saw her at intervals, but no pregnancy occurred; and when I saw her last, in 1918, she gave a history of 2 months' amenorrhea, with heats and flushes, pointing to an early menopause. She was then 40 years of age. It seems evident that ovarian activity was below the normal standard.

When a double uterus is associated with a double vagina, complications may arise during delivery.

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## CHAPTER VIII

### Primary Sterility : B. Acquired Sterility : Cessation of Ovarian Activity

By "acquired sterility" I mean that a woman has started her sexual life potentially fertile ; and that before she has had an opportunity of conceiving, or, at any rate, before she has conceived, changes have taken place which have affected either the ovulation function of the ovary or the condition of the genital passages ; the result of these changes being that conception can no longer occur.

Four principal groups of conditions will require consideration :—

1. Cessation of ovarian activity, natural or artificial.
2. Trauma and infection, affecting the patency of the genital canal or inducing an unhealthy condition of its linings.
3. Displacement of the uterus
4. Tumours of the genital organs.

### Cessation of Ovarian Activity

Ovarian activity may be suspended temporarily or permanently. A well-known example of temporary suspension is the physiological cessation of ovulation during pregnancy and lactation.

*Pathological temporary cessation* is found in certain diseases, such as anaemia ; severe exanthemata, especially enteric and scarlet fever ; myxoedema and cretinism ; and insanity, especially in the melancholia type. The obvious thing in these dis-

cases is the arrest of menstruation: to say that the arrest of menstruation is due to suspension of ovarian activity is an inference, but a quite proper one in the light of what is known of the phenomenon of menstruation.

With the restoration of health, whether physical or mental, menstruation reappears, and here again we are, I think, justified in making the inference that it reappears as the result of the resumption of ovarian activity.

During the period of cessation, pregnancy cannot occur, and therefore the condition of the patient is one of acquired sterility.

Ovarian activity may also be suppressed temporarily as the result of severe mental shocks or nerve-strain. Most practitioners have met with cases in which menstruation ceased as the result of a fright; an unexpected encounter with a rat or a mouse has been known to do it. More often the mental shock is more profound, such as the sudden news of the unexpected death of the husband or other relative, the sight of an accident to a child, or an accident befalling the patient herself. After a time the ovarian activity is restored and menstruation recurs; but during the period of abeyance the patient is in a condition of temporary acquired sterility.

*Permanent cessation of ovarian activity* is found normally at the menopause; pathologically, it may be brought about prematurely by one of the causes enumerated when speaking of the temporary form. We must presume that to produce a permanent result the effect on the ovaries is more profound. We do not know precisely the *modus operandi:* it may be through the influence of the nervous system directly, or it may be by changes of metabolism or the circulation of toxic elements affecting the ovarian tissue. The taking of certain

drugs has the same effect: thus in victims of the *morphia-habit* a premature menopause occurs.

I met with an instance in a childless patient aged 35, married 8 years: she had been taking morphia for 10 years, and had begun it for the purpose of relieving dysmenorrhœa. When I saw her, menstruation had ceased for a year, and she presented the constitutional symptoms of the menopause in the form of flushes and sweats.

*Acromegaly* may lead to premature menopause: I had an instance of this in a single woman aged 27: she had had no menstruation for a year. At that time the symptoms appeared to be due to anæmia: later the skin showed the appearances of myxœdema. Two years later she saw the late Dr. Beevor, who made a diagnosis of acromegaly and later still a tumour developed in the pituitary gland, with an ultimately fatal result.

I have met with several cases of premature menopause following mental shock: but as they were women who had had children they do not figure among my cases of sterility and I need not relate them here.

In some cases the pelvic organs are under-developed though not sufficiently to prevent the occurrence of menstruation. In these patients the period of sexual maturity is apt to terminate early, and a premature menopause is the result.

The following are some examples —

Case 36. The patient was aged 41, and had been married 20 years without offspring. Menstruation started at the age of 12½, but was always scanty. She ceased to menstruate at the age of 40, and for two years previously had had long periods of amenorrhœa. She had suffered from heats and flushes for 4 years. On examination the vagina was narrow, and the uterus small, the sound entering only 5 c.m. (2 inches).

Case 37.—A patient, aged 49, had been married 7 years.

Menstruation ceased at the age of 32. The size of the uterus in its normal state could not be estimated, because when I saw her she was suffering from carcinoma of the body of the uterus; but it is a matter of interest that at the operation both ovaries were found markedly atrophic.

Case 38.—This was a young woman of 30; she had been married 2½ years. She felt well, but came for advice because menstruation ceased 5 months after marriage and there had been no sign of it since. She began to menstruate at the age of 15, and the loss was always small and lasted only 2 to 3 days. The breasts were small and ill-developed; the vulva and vagina were normal. The cervix was small, the uterus was of normal length, but felt small in diameter.

In other cases the pelvic organs present no obvious abnormality, and we have no clue as to the cause of the premature cessation of ovarian activity.

Case 39.—A woman, aged 43, had been married 18 years. She was troubled with "nerves" and bad memory, and at times with flushes of heat. Menstruation ceased at the age of 32, but she said that she had had a "show" 3 times, at yearly intervals. The vagina was normal, and the uterus was normal in size and position. She was very fat, and weighed 15 stone; and she stated that 3 years previously she had weighed 18 stone.

Case 40.—In this case the patient was a young woman of 25, married a year and a half. Her last proper period was a year ago, though she had had a few small "shows." She suffered from flushes of heat. She thought that she was pregnant, and made all preparations for her confinement. On examination the uterus was nulliparous, but of normal size. A point of some interest was that there was secretion in the breasts. She was very fat.

The last two cases illustrate a point which has long attracted the attention of medical men, namely *the association of sterility with obesity*. This is doubtless only a part of a much larger question, namely, the influence of metabolism on the reproductive function. It is well known that in the lower forms of animal life metabolism and the

reproductive function are closely inter-dependent. To quote two well-known instances –the bee and the aphis or greenfly. The queen-bee lays a great number of eggs, some male and some female; and with the latter it is purely a question of the quality of food supplied that determines whether a given female egg will develop into a sexually-mature queen, or into a "neutral" worker, which is a female without the capacity for reproduction. In the case of the greenfly, abundance of food and sufficient warmth lead to the development of sexually active male and female forms; in the opposite conditions reproduction is effected without the instrumentality of the male, by the process of "parthenogenesis."

Oliver (1) says that in many plants (and, we might add, in some animals also), high nutrition lessens reproduction; and he adds, "I have frequently remarked that women who tend to lay on fat rapidly are apt to become barren."

Kisch (2) made an analysis of 215 obese women; 49 of these had amenorrhoea, and 116 had scanty menstruation. Further, of the 215 women, 48 were sterile, giving a proportion of 1 in 5, as against the general proportion of 1 in 9 or 10. Kisch expresses the view that the extensive formation of fat has a direct effect in hindering the normal development of ova; and believes that in some cases sterility can be cured by treatment directed to the reduction of fat.

Brondel (3) records a case of sterility due to obesity, in which after the weight had been reduced by 20 kilograms, pregnancy ensued, and went on to full term.

Apart from metabolism, there are other factors that influence ovulation. It is well known that captivity and domestication exert a great effect on the reproductive capacity of wild animals. Climate has the same effect.

Immoderation in sexual intercourse often leads to a fruitless marriage; and in some cases a period of sexual rest followed by moderation in intercourse will lead to the desired conception.

Oliver, in his thoughtful and suggestive paper, brings out some further points of interest. Thus he recalls the fact that prostitutes, so long as they persist in cohabiting with a variety of males, prove sterile, though no special mode of protection is adopted to prevent conception. He explains this by saying that it doubtless depends upon the fact that various germinal elements tend to counteract each other; and quotes the analogy of plants that remain barren if the pollen of several plants is deposited on the flowers. He goes on to say, "Bees and ants teach us that a life of ease and idleness is that most favourable to reproduction, whilst a life of great activity predisposes to barrenness. That race which is physically as well as mentally idle, and is at the same time well-fed, is likely to prove more fertile than another race living under directly opposite conditions." This view receives support from a circumstance that has come within the cognisance of many observers, medical and otherwise; namely, that among people of the middle classes who ordinarily live a strenuous life, but are able to take a holiday of several weeks in the summer, the wife not infrequently conceives during this more restful time.

There is, doubtless, no subject so wrapped in obscurity and complexity as this one of the reproductive function, and for every rule that we think that we can lay down we shall find a baffling crop of exceptions. But it is certainly true, both for man and for woman, that a life of moderate and healthy activity, unaccompanied by mental or physical exhaustion, with moderation in diet and studied

restriction of sexual intercourse, produces the conditions most favourable to fruitful marriage.

*X-Rays in relation to Sterility.* Among the many activities of the X-Rays has been found a potent influence on germinal cells. Exposure to these rays leads to atrophy of the ovaries and to consequent cessation of ovarian activity. It is known that a similar effect is exerted on the testes, in the case of the male.

At present we have no accurate data as to the minimum X-Ray dosage that will produce these effects, and it probably varies with different individuals. But it is certain that women workers in X-Ray departments should be very careful not to expose themselves to the action of the rays.

*The removal of the ovaries* by operation naturally leads to a rude and uncompromising cessation of their activity, and so to sterility. Also, the total removal of the ovaries leads to a cessation of menstruation. I have used the apparently superfluous word "total," because in a certain proportion of cases in which both ovaries were supposed to have been removed, menstruation has continued.

In a study of the after-results of abdominal operations (4) I investigated this question in the case of 104 patients upon whom I had operated. In 8 of them the menopause had occurred before the operation. The results in the remaining 96 are shown in the following table (VIII). The cases are divided into 3 groups, D, E, and F: Group D includes Double Ovariotomy for Ovarian Tumours; Group E., Double Salpingo-oöphorectomy for Inflammatory Tubal disease; and group F. the same operation for Tubal pregnancy of one or both sides.

The fact that over 40 per cent. of the patients continued to menstruate is remarkable. In my original communication the details of the cases are

given, but I will not take up space by reproducing them. I will content myself with quoting the summing up.

The striking feature about the cases in Group D in which menstruation persisted is that, with one exception, the tumour was parovarian or intraligamentary or associated with inflammatory conditions; and these are precisely the conditions in which a portion of an ovary is most readily left behind in connection with either the proximal or the distal part of the stump.

TABLE VIII.—SHOWING THE PROPORTION OF CASES IN WHICH MENSTRUATION PERSISTED AFTER REMOVAL OF THE APPENDAGES OF BOTH SIDES.

| | D. | | E. | | F. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| Menstruation ceased .. | 14 | 63·7 | 34 | 54 | 8 | 72·7 | 56 | 58·3 |
| Menstruation continued | 8 | 36·3 | 29 | 46 | 3 | 27·3 | 40 | 41·7 |
| | 22 | 100·0 | 63 | 100 | 11 | 100·0 | 96 | 100·0 |

Among the thirty-two cases in Divisions E and F there are three cases in which we know that an ovary was preserved, and two cases of fibroids of the uterus. In the remaining twenty-seven cases we must assume that some portion of ovarian tissue was left behind. This view receives some additional support from the fact that among the cases in Divisions D, E, and F, in which menstruation continued, there was a large proportion of cases where the uterus and vagina showed no atrophy. Thus, of thirty-seven cases, there were twenty-nine, or 78 per cent., in which the uterus and vagina remained normal, and of the remaining eight, in which some atrophy was present, there were six in which menstruation had ceased when the patient came under

observation, although it had continued for some years after the operation. The relation between continuation of menstruation and normal sized uterus and vagina is, therefore, a close one, and it is a warrantable assumption that both factors are governed by the preservation of some ovarian tissue.

The influence that is at work in keeping up menstruation, whether it be a hypothetical portion of ovarian tissue or not, does not appear to be a very long-lived one, for in seventeen of the above thirty-seven cases menstruation had ceased when the patient had come under observation. The length of time that menstruation continued after operation and the age of the patient when it ceased in these cases are shown in the following list :

| Duration of Menstruation. | Age at Cessation. | Duration of Menstruation. | Age at Cessation. |
|---|---|---|---|
| 7 years .. | .. 38 | 3 years .. | .. 25 |
| 9½ ,, .. | .. 32 | 2½ ,, .. | .. 39 |
| 4 ,, .. | .. 38 | 1½ ,, .. | .. 32 |
| ½ ,, .. | .. 30 | ¾ ,, .. | .. 30 |
| 1½ ,, .. | .. 39 | ¾ ,, .. | .. 38 |
| 1 ,, .. | .. 38 | 1 ,, .. | .. 17 |
| 3 ,, .. | .. 28 | ½ ,, .. | .. 46 |
| 3 ,, .. | .. 31 | ¼ ,, .. | .. 35 |
| 4 .. .. | .. 35 | | |

The removal of the uterus does not lead to immediate cessation of ovarian activity, although in the absence of the uterus there is a cessation of menstruation. Such a patient therefore presents what I have called "the apparent menopause:" the true menopause, as indicated clinically by flushes and sweats, comes on later. I investigated this question also in the work referred to, and the data brought out two points.

First, that the true menopause does not usually come on for several years after the removal of the uterus, with conservation of one or both ovaries, in

women who have not attained the age of the menopause, and consequently the cessation of menstruation in such cases is properly described as an "apparent" menopause. Secondly, that the removal of the uterus often brings about the true menopause a good deal earlier than the usual time.

The bearing of these questions on the subject of sterility is this: that if a portion of ovarian tissue be left, ovulation may occur; and some rare and remarkable cases have been reported in which pregnancy actually occurred after the removal of the uterus, and also after the apparent removal of both ovaries. It is true that these cases are pathological curiosities; but they justify an aphorism that I enunciated (5) some years ago: "It is unsafe to state, on the ground of the condition of a woman's pelvic organs, that she cannot become pregnant, unless you have yourself removed her uterus, ovaries, and tubes, and even then it is wiser to say that it is improbable."

*Age in Relation to Sterility.*—Theoretically, a woman may conceive at any time from the onset of menstruation until its cessation, that is, during the period of sexual maturity. In practice, it is found that there is an age of maximum fertility, namely from 20 to 24, and that from the age of 25 onwards there is a

TABLE IX.—SHOWING THE VARIATIONS OF STERILITY ACCORDING TO THE AGES OF THE WIVES.

| Ages of wives at marriage. | 15–19 | 20–24 | 25–29 | 30–34 | 35–39 | 40–44 | 45–49 | 50 | Total |
|---|---|---|---|---|---|---|---|---|---|
| Number of wives | 700 | 1835 | 1120 | 402 | 205 | 110 | 46 | 29 | 4447 |
| First children .. | 649 | 1905 | 809 | 251 | 96 | 10 | 2 | — | 3722 |
| Sterile wives .. | 51 | — | 311 | 151 | 109 | 100 | 44 | 29 | 725 |
| P'centage Sterile | 7·3 | — | 27·7 | 37·5 | 53·2 | 90·9 | 95·6 | 100 | 16·3 |
| Proportion Sterile, 1 in | 13·72 | — | 3·60 | 2·66 | 1·88 | 1·10 | 1·05 | 1·00 | 6.13 |

steady increase in the proportion of sterile marriages. These facts were first enunciated by Matthews Duncan in his classical Statistical Enquiry (6) from which I reproduce Table IX.

On this table, Duncan comments as follows :—

"So far as the numbers are to be relied upon, we have from this table the interesting results, that about 7 per cent. of all the marriages between 15 and 19 years of age inclusive, and as they occur in our population, are without offspring; that those married at ages from 20 to 24 inclusive are almost all fertile; and that after that age sterility gradually increases according to the greater age at the time of marriage."

The truth of Duncan's contentions has never, as far as I know, been questioned: and we must conclude therefrom that whereas pregnancy is not impossible at any age during the period of sexual maturity, nevertheless ovarian activity begins to decline in vigour after the age of 25, at first slightly, and then progressively more emphatically. As I imagine it, the position is that between the ages of 20 and 25 the woman is ready to conceive at almost any time that intercourse happens to take place. As she gets older, the favourable moments become more and more spaced out, so that the likelihood of intercourse being fruitful at any particular time becomes gradually less. After the age of 45 the woman still has her favourable moments, but they are so rare that the chances of pregnancy are reduced to 1 in 20.

It is evident that inasmuch as national welfare depends among other things upon the fertility of the population early marriages should be encouraged; and that in so far as these are hindered by poverty or straitened means we may heartily echo the sentiment of Tennyson,

"Cursed be the social wants that sin against the strength of youth."

Unfortunately, early marriages are not prevented alone by the want of means; but are discouraged by a too prevalent preference for a life of ease, luxury and pleasure; and, further, among those who marry young there is a too prevalent desire to shirk the responsibilities of parentage, and to postpone its possibility. Not infrequently, after several years of married life, lived "for pleasure," the desire for children awakes, only to be met by an inexorable "too late."

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## CHAPTER IX

### Primary Sterility: B. Acquired Sterility: Trauma and Pelvic Inflammation

*Trauma of the Genital Passages in Relation to Sterility.* Accidental injuries involving the vulva and vagina may lead to cicatricial contraction of such a degree as to prevent intercourse and lead to sterility. Thus girls and women have been injured by the breaking of a chamber utensil on which they were sitting; or have fallen from a height astride the back of a chair or some similar obstacle.

In other cases the injury has been the result of some surgical intervention, in which case the cervix as well as the vagina may have become damaged. With the object of relieving dysmenorrhœa due to an acute anteflexion, operations have been performed with more zeal than judgment, and the cervix has been torn, split, or amputated and the vaginal walls damaged.

Much damage may also be done to the vaginal walls by the incautious application of strong caustics. The resulting ulceration may be in the form of a ring round the vagina, a little below the cervix: as the ulcerated surface heals, cicatricial contraction takes place, and the vagina assumes an "hour-glass" shape. I have met with this condition several times. In other cases the vagina as a whole becomes narrowed, with cicatrized walls. In extreme cases the vaginal canal has become actually occluded.

In some of these cases the damage can be repaired

by a plastic operation; in others nothing can be done. From the point of view of pregnancy the outlook is generally hopeless.

*Pelvic Inflammation in Relation to Sterility.*

Inflammation of the genital passages is undoubtedly the most important cause of acquired sterility.

Of my 530 cases of sterility, 53 or 10 per cent. had endometritis or vaginitis, or both; and 58 or 10·9 per cent. had inflammatory disease of the tubes—salpingitis, hydrosalpinx, or pyosalpinx. In nearly all of these cases the diagnosis was verified by a subsequent operation.

Thus, in all there were 111 cases out of 530, or nearly 21 per cent.—in other words, 1 case in every 5, in which sterility was attributable to pelvic inflammation. It is a melancholy reflection that in nearly all these cases the condition is preventable.

If we attempt to estimate the effect of this factor alone on the birth-rate, the figures are rather startling, We found in Chapter II. that at least 10 per cent. of marriages are unfruitful; and in one-fifth of that 10 per cent. the cause may be attributed to pelvic inflammation. Thus 2 women out of every 100 married are sterile on this account. If we assume that on the average 3 children are born from each fruitful marriage, then 6 children are lost to the future population for every 100 women married. The number of marriages in the United Kingdom every year is about 333,500 *; consequently every year the chance of some 20,000 children being added to the future population is lost, *owing to preventable causes.*

In the majority of cases the cause of inflammation

* The figures of the Registrar-General for the year 1916 are:-Marriages in England and Wales, 279,846; Scotland, 31,483; Ireland, 22,245. Total, 333,574.

of the genital passages is gonorrhoeal infection, which will be considered later. Non-gonorrhoeal inflammation plays a more modest, but none the less definite part, and we may deal with this first.

*Non-gonorrhoeal inflammation of the genital passages.*

*Simple Vaginitis* is not an important condition, because as a rule it is transient and easily curable. Nevertheless as long as it is present it will lead to sterility; partly because the pain and tenderness of the vagina preclude intercourse: and partly because, if intercourse took place, the pathological secretion would probably be injurious to the vitality of the spermatozoa. I have qualified this statement by using the word "probably:" because if the vagina alone were affected, and the cervix were healthy, it is possible that spermatozoa thrown directly on the external os might effect a safe entrance and so escape the lethal influence of the vaginal secretion.

*Endometritis* is a serious obstacle to impregnation. It is true that the condition seldom causes pain and therefore does not prohibit intercourse; but the presence of the muco-purulent secretion from the cervical glands creates a barrage through which the spermatozoa cannot pass unharmed. With endometritis is often found the condition described as "adenomatous disease of the cervix," and commonly and conveniently (if less scientifically) called "erosion." From the red and raw-looking surface muco-pus is secreted and this conspires with the cervical secretion to destroy any spermatozoa that may approach it.

The prognosis of endometritis in relation to future pregnancy is a doubtful one. Mild cases can certainly be cured by curetting and disinfection of the

uterine cavity; but on the other hand endometritis may be followed by two complications which, though not necessarily dangerous to life, are grave from the point of view of conception. The first is that the inflammatory process may spread upwards and affect the tubes; the second is that pathological changes may be set up in the uterine mucosa serious enough to damage irreparably its structure, and so render it incapable of fulfilling its two important functions, which are, to facilitate the passage of the spermatozoa towards the waiting ovum, and to afford anchorage, protection, and nourishment to the fertilized ovum.

We may mention here that ill-understood condition of the endometrium which causes *membranous dysmenorrhoea*. It is possible that it must be regarded as a form of endometritis. At any rate, it appears to be highly unfavourable to pregnancy. There were two such among my cases of sterility. One, a patient aged 31, had been married 4 years, and gave a history of a doubtful miscarriage. She was curetted, and the membranous dysmenorrhoea disappeared: two years later, when I saw her, she was three months pregnant. The other, aged 25, had been married 2 years, with no sign of pregnancy. She also was curetted and became pregnant a year later.

*Kraurosis Vulvae* is a form of dermatitis of the vulva which leads to a remarkable atrophy of the vulva and vaginal orifice. As a rule it comes on late in the sexual life, about or after the time of the menopause, in which case it has no interest from our present point of view. But occasionally it occurs in young women, and then it may play a definite part in the production of sterility, by narrowing the vaginal outlet. Two illustrative cases may be quoted.

Case 41.– The first occurred in my sterility group. She was a woman of 28, married 2 years; there was marked kraurosis, with atrophy of the labia and prepuce: the vagina was narrow and short, the uterus was under-sized and the external os small. In view of the condition of the uterus, the outlook for pregnancy was bad: but to remedy the difficulty with intercourse, a dilatation of the vaginal orifice was done. This gave only partial relief, and a plastic operation was suggested, but I lost sight of the patient, and do not know whether the suggestion was adopted.

Case 42.– The second case was a young Jewish girl of 22, sent to me by the late Dr. Herman, who desired that I should endeavour to remedy matters so that a certificate of nubility could be given to her. There was a good deal of atrophy, involving the labia minora and vaginal orifice in much the same way as with kraurosis vulvæ: the prepuce was oedematous and nearly obscured the clitoris. The atrophy had caused cicatricial contraction of the vaginal orifice. I took her into hospital, and performed a plastic operation for the enlargement of the vaginal orifice. Three years later (in February, 1911) I saw her again: she wished to become engaged the following week. On examination, the vagina was in good condition, and I gave her a certificate of nubility. She was married in August, 1912, and a boy was born in January, 1914.

*Salpingitis and Pelvic Peritonitis.*—It is now well established that salpingitis is the result of gonorrhœa in about 95 per cent. of the cases. In the remaining 5 per cent. it is due to tuberculosis or to infection from the bowel. Tuberculous salpingitis and pyosalpinx necessarily cause sterility in exactly the same way as when these conditions are due to gonorrhœa; and the sterility is, of course, irremediable. We need not dwell on them here.

There is, however, a subject which has not received the attention that it deserves, and that is, the effect on the tubes of infection of the pelvic peritoneum due to recurring appendicitis; and we may well devote a paragraph to it.

*Recurrent Appendicitis in relation to sterility.*

Among my 530 cases of sterility there were 23, or 4·4 per cent. (see Tables IV. to VI.), in which there was a history of previous "peritonitis," with no question of gonorrhoeal infection. Table VI. shows that all these patients were under the age of 32 when they were married. In 15 of the cases there was a history of recurring attacks of appendicitis; 10 of them had had the appendix removed after several attacks, and I operated on some of the others. In several cases my notes state that there were old appendix adhesions.

The following are some illustrative cases:—

Case 43.—I saw a patient, aged 28, who had been married 6 years without becoming pregnant. She gave a history that at the age of 18 she was operated upon for "abscess and peritonitis"; she had had no illness since, and came for advice on account of her sterility. The uterus was normal, the appendages could not be defined clearly. I came to the conclusion that she had had an appendix abscess which had probably led to sealing up of her tubal ostia, and gave a bad prognosis as to the chances of pregnancy.

Case 44.—I was called to see a woman, aged 31, with symptoms of acute appendicitis. She had been married 7 years without children. There was a history of attacks of pain in the lower abdomen dating back 3 years. At the operation a gangrenous appendix was found dipping down into the pelvis. I did not think it advisable to disturb the pelvic organs to ascertain their condition; but the pelvic position of the appendix and the three years' history led me to think that chronic pelvic inflammation was the probable cause of the sterility.

Case 45.—This was a young woman of 26, married 2 years. For some years she had suffered from dysmenorrhoea, the pain being usually referred to the right side. On examination the uterus was normal, the appendages not defined. The position of pain and tenderness was in the appendix area, and my diagnosis was chronic appendicitis, perhaps with adhesions to the right appendages, in view of the aggravation at the time of the periods.

Case 46.—A patient aged 34, who had been married 7 years, gave a history of recurring attacks of right iliac pain, the first of which dated back 5 years. The uterus was pushed over to the left by a swelling in the pouch of Douglas. There had been a rise of temperature for 3 days. At the operation a condition of subacute appendicitis was found, with adhesions in the neighbourhood.

Case 47.—This patient was 32 years of age, and had been married 2 years. Eleven years ago she had appendicitis for which the appendix was removed, together with the right tube and ovary. For two years she had had attacks of pain in the left side. On examination the uterus felt normal; right appendages absent; left tube and ovary felt thickened. I diagnosed a chronic salpingo-oöphoritis of the left side, originating, in all probability, from the old appendix trouble.

Case 48.—A young woman of 28, who had been married 4 years; she gave a history of backache and pain in the right side. The uterus was markedly retroverted. I operated in order to do a hysteropexy; there were old adhesions in the appendix area, and I removed the appendix.

Now the importance of this condition from the point of view of sterility is manifest. Recurring attacks of appendicitis lead in many cases to pelvic peritonitis; the open ends of the tubes in this area are very vulnerable, and may easily be sealed by adhesions, as a result of which their function is permanently destroyed.

The frequency of this occurrence is almost certainly not appreciated. Apart from the cases above mentioned, I have frequently had occasion to operate for retroversion where the uterus was bound down by adhesions, and infection through the vagina could be excluded. In many cases the adhesions involved the ovaries and tubes, which were sealed up against the back of the broad ligaments. Undoubtedly the most probable cause of such adhesions in the majority of cases is old appendix trouble.

Experience of these cases has convinced me that

a very considerable number of women have been doomed to childlessness by the expectant treatment of early attacks of appendicitis; and I have been forced to the conclusion that in order to preserve for them the hope of happy motherhood, girls and young women should invariably be operated upon without delay when the appendix gives signs of trouble. To wait for an acute attack is to invite the danger and the prolonged convalescence that are attendant upon an operation for a gangrenous appendix or an appendix abscess: this much is appreciated by all surgeons. But, in addition, it means submitting the patient to the more permanent injury of damage to the Fallopian tubes owing to the incidence of pelvic peritonitis; and to the blighting doom of sterility.

### Gonorrhoeal Infection and Sterility.

The rôle of gonorrhoea in the production of sterility has been much discussed, and has led to the expression of widely divergent views.

Gonorrhoea produces sterility, first by its effects on the man, and secondly by its effects on the woman.

Noeggerath (1) concludes from a study of latent gonorrhoea in women that about 90 per cent. of sterile women are married to husbands who have suffered from gonorrhoea either previous to or during married life. The inference is that 90 per cent. of cases of sterility are due to the effects of gonorrhoea either on the husband or on the wife. We know that, unfortunately, a large number of young men contract gonorrhoea at some time before their marriage; and it is just possible that 90 per cent. of sterile women have married men so affected. My own view is that, for this country, at any rate, the figure of 90 per cent. is widely outside the mark;

but even if we accepted this ratio, the certain fact remains that many women whose husbands have had gonorrhoea have borne children; and to infer that 90 per cent. of cases of sterility are due to gonorrhoea is undoubtedly a great exaggeration.

Ellice Macdonald (2) quotes Lier and Ascher as saying that gonorrhoea causes 13 per cent. of cases of sterility; and Pincus as putting the figure at 15 per cent. It is probable that these estimates are much nearer the truth than Noeggerath's. We may accept Noeggerath's view that gonorrhoea remains latent in certain sections of the organs of generation, both in men and in women, notwithstanding its apparent cure, but we should join issue with him in his contention that it persists for life in every case.

Though we are not here concerned with sterility in the male, we may point out that the way in which gonorrhoea leads to male sterility is by extension of the gonorrhoeal affection along the spermatic cords and the setting up of a bilateral epididymitis. When this occurs, it is followed by azoöspermia in the majority of cases. If one side only is affected, the man may beget healthy children.

Many a man suffering from latent and even from active gonorrhoea has impregnated his wife and infected her with gonorrhoea at the same time. In other cases a man has infected his wife, who, by extension of the infection to the Fallopian tubes, has become sterile: nevertheless the man is still capable of impregnating another woman.

Thus the rôle of gonorrhoea in causing sterility in the male is a limited one.

Now what about the part played by gonorrhoea in producing sterility in women? This part is large enough and serious enough, even if we do not take an exaggerated view of it.

When a woman is infected, she develops gonorrhoeal vaginitis and urethritis. By prompt and early treatment this may be cured before the infection has extended up through the uterus to the tubes, and the women may thereafter become pregnant.

But we have to consider two other possible courses. The first is, that the infection is not arrested in time, and the tubes become involved. In some cases the infection is rapid, and does not stop at the tubes, but passes out through the fimbriated openings, and sets up a pelvic peritonitis which is usually of a subacute type, but occasionally is very acute and may prove rapidly fatal. In other cases the infection spends itself mostly on the tubal mucosa, which swells up, occluding the tubal ostium; later, the ostium becomes actually sealed up, and pus, accumulating in the tube, produces the condition known as pyosalpinx. With this is nearly always associated some peritonitis round the tube, leading to the formation of adhesions. When the infection is not too virulent in character, the pus may become changed in its character, and the tube becomes the seat of a hydrosalpinx; or it settles down into a chronically inflamed and occluded, but not necessarily distended, tube. Whatever the form taken by the tubal infection, the fact of such an infection renders the woman irrevocably sterile. There is possibly one exception to this general statement, and it is this: that in some few cases the tubes may be the subject of nothing more than a very mild salpingitis, the ostia remaining patent; and such tubes may perhaps recover their function sufficiently to allow of conception taking place. But even if this happens, another danger may be lurking around; the fertilised ovum may fail to reach the uterus, and become arrested in the damaged tube and develop as an extra-uterine

pregnancy, with all its attendant risks to the mother and practically certain death to the ovum.

The second course that we have to consider is that the woman becomes impregnated and infected at the same time. The pregnancy may go to full term; but the gonorrhoeal infection may remain latent in the uterus or in the tubes: and with the onset of the puerperium an acute infection breaks out in the tubes, and if the mother escapes with her life she remains sterile for the future. The investigations of MacDonald, Stone, and Bumm have shown that this course of events is by no means infrequent: and MacDonald concludes that "one-child sterility" is much more commonly caused by gonorrhoeal infection than is complete sterility.

In discussing secondary sterility (in which "one-child sterility" is included) later on, we shall see that tubal disease following labour is an important factor.

Gonorrhoeal infection plays its most devastating part in causing sterility in the case of young women. In Table IV. we see that whereas tubal disease was present in about 11 per cent. of all cases of sterility, it was found in 14·4 per cent. of women of 24 years of age and under at the time of observation, and in 14·1 per cent. of those aged 25 to 29. Patients of 30 to 39 showed the average rate of 11 per cent., whilst in patients over 40 the proportion dropped to 6·5 per cent. Similarly, in Table VI., tabulated according to the age at the time of marriage, we find that tubal disease was present in 15·7 per cent. of women married at the age of 24 or under; in 8·9 per cent. of those married at the age of 25 to 32: and in 4·4 per cent. of those married at the age of 32 and upwards.

Thus we see that it is precisely at the age when the promise of fertility is greatest that we find the

greatest number of women for whom the great Promise of Life—Motherhood—is blasted for ever by the preventable scourge of gonorrhoea.

Now that public attention has been more focussed on the subject of venereal disease, and that legislators are showing less disposition to treat this subject after the proverbial manner of the ostrich, we may perhaps hope to find some reduction in the number of innocent young wives whose health and hopes are sacrificed on their wedding night. Perchance an enlightened public opinion will lead the parents and guardians of girls who are about to be married to require from intending bridegrooms, if not a medical certificate of health, at least an affirmation on their word of honour that they are, to the best of their knowledge and belief, free from any present venereal taint.

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# CHAPTER X

## Primary Sterility: B. Acquired Sterility (*contd.*). Uterine Displacements and Sterility

Under the head of uterine displacements we have -

1. Backward displacements, namely retroversion and retroflexion.

2. Downward displacements, namely prolapse and procidentia. Anteflexion is generally included among displacements in text-book descriptions, but it is a defect of form rather than of position, and as such is more correctly described among malformations. I have already considered its bearing on sterility under that heading.

Displacements must be reckoned among the more important causes of sterility. Among my cases (Tables IV., V., and VI.) they numbered 54 out of 530, that is 10 per cent., their frequency being about the same as cases of endometritis and vaginitis, and nearly as high as cases of tubal disease.

The chief age-incidence of displacements appears to be between 25 and 35: of 273 cases between these age limits, 27 or 13·5 had displacements: of 222 cases above the age of 35 there were displacements in 16, or 7·2 per cent. Of 35 cases under 25, only 1 had a displacement.

Displacements appear to play a more important relative part within the first 5 years of marriage than they do later. Of 262 women married 5 years or less, 33 had displacements, or 12·6 per cent.;

of 268 married over 5 years, 21 had displacements, or 7·8 per cent.

When we come to investigate the nature of the displacement, my notes show 38 cases of mobile retroversion and retroflexion ; 14 cases of adherent retroversion ; and 2 cases of prolapse.

It is not surprising to find only 2 cases of prolapse, because, as we know, that condition is nearly always a sequence of childbirth. Procidentia is even rarer among nulliparae. We shall find a much larger proportion of cases of downward displacement when we consider the causes of secondary sterility, that is, sterility coming on after the birth of one or more children.

We cannot say that backward displacements always cause sterility, for it is not a very uncommon thing for a woman to exhibit, about the third month, the uncomfortable symptoms and the unmistakable signs of retroversion of the gravid uterus ; and many of these women miscarry, unless the condition is detected in time and the uterus pushed up out of the pelvis.

But that a displacement is the cause of sterility in many cases cannot be doubted. How does it act ? I think in three ways. The first is by reason of secondary changes set up in the uterus, hyperplasia, and endometritis. In such cases the uterine secretions are apt to become pathological, and, as we have seen, have a deleterious effect on the spermatozoa.

The second is in view of associated adhesions, in cases of adherent retroversion ; for then the tubes are very likely to share in the peritoneal inflammatory process. In fact, in these cases, the tubes may have a greater responsibility for the sterility than the displacement. It is in harmony with this that we find the prognosis as regards sterility very bad in cases of adherent retroversion, even when the dis-

placement has been remedied by operative treatment. I find no record among my patients of any of them having become pregnant after a hysteropexy for adherent retroversion.

The third way in which retroversion causes sterility is by the displacement of the cervix: the os points downwards and forwards, and sometimes even more definitely forwards, instead of downwards and backwards, and so is in an unfavourable position for receiving the semen during intercourse. It is probable that the *modus operandi* that I suggested when speaking of anteflexion is applicable in some cases of retroversion; namely that the os looks so far forwards that during intercourse it is pressed against the anterior vaginal wall, which thus closes over the os like a lid, and so effectually prevents the entrance of spermatozoa.

The importance of backward displacements in causing sterility is borne out by the favourable results of treatment in cases of mobile retroversion. Among the 37 patients who had this condition, I was able to trace a subsequent pregnancy in 7, as follows:

Case 49.—When I first saw this patient she was a single girl of 23, suffering from menorrhagia. A rectal examination showed that the uterus was anteflexed and elongated. Six years later I saw her again: she had been married 15 months, and wanted to know about pregnancy. Expecting to find an acute anteflexion I examined: but found the uterus markedly retroverted and flexed. I replaced the uterus, and put in a Hodge pessary in August, 1913. She became pregnant in December of the same year, and had a normal confinement of a boy in September, 1914. In February, 1915, the uterus had fallen partly back again, and a Hodge was reintroduced; she became pregnant in March, 1916, and in December of the same year a second boy was born. After this the displacement recurred, and I operated, attaching the uterus by hysteropexy.

Case 50.—This patient was aged 28, married 2 years. She suffered from increase of menstruation, and had had no

children. On examination the uterus was completely retroverted. This was replaced and a Hodge pessary introduced, in December, 1903. She became pregnant at the end of January, 1904, and had a normal confinement in October.

Case 51.—This was a doctor's wife, aged 31 ; she had been married 2 years and was anxious to become pregnant. The uterus was markedly retroverted, and it was replaced and a Hodge pessary introduced in February, 1915. She became pregnant two months later, and had a normal confinement in January, 1916. In December of the same year she had a miscarriage at 2 months, due, apparently to a return of the displacement ; and operation was advised.

Case 52.—A patient aged 28, married 1 year, whose chief complaint was dysmenorrhoea. There was a marked retroversion of the uterus, which was replaced, and a Hodge pessary introduced in February, 1915. She became pregnant at the end of March of the same year, and was confined in December. In March, 1917, she had a second confinement. A year and a half later the uterus was still in good position.

Case 53.—This was a young woman of 22, married for a year. She suffered from dysmenorrhoea. The uterus was lying quite back, and hysteropexy was advised. This was done in September, 1901 ; she had one period after leaving the hospital, and then became pregnant, but miscarried at 3 to 4 months. She became pregnant again in November, 1906.

Case 54.—This was the patient referred to in Case 1. When first seen she was aged 27, and had been married 2 years ; the uterus was small and retroverted. At first treatment was limited to reposition of the uterus, as it was so small that pessary treatment did not appear promising. Later a Hodge was tried, but it did not hold the uterus up, and in May, 1908, 3 years after I first saw her, I did a hysteropexy. In October, 1908, pregnancy took place and a natural confinement of a boy occurred in August, 1909. The uterus maintained its normal position after the confinement, and a second child was born in January, 1911.

Case 55.—I saw this patient first when she was a single girl of 22 ; and as in Case 49, there was at that time acute anteflexion, associated with dysmenorrhoea. The hymeneal orifice was no larger than would admit a lead pencil. Under anaesthesia the vaginal orifice was dilated, and the anteflexion treated by dilatation and an intra-uterine stem. At the age

of 27 she married, and a few months later I saw her; the vaginal introitus was small and the uterus markedly retroverted. Under anaesthesia the vaginal orifice was dilated, the uterus replaced and a Hodge pessary introduced. Pessary treatment was continued for 14 months with indifferent success, and I then did a hysteropexy. Two and a half years later she became pregnant and had a normal confinement.

The fact that two of these patients had an anteflexion as single girls, and that the anteflexion was replaced later by a retroversion is of interest; especially as in the case of one of them the anteflexion was not treated. This confirms what was said in Chapter VII., as to the tendency of anteflexion to become corrected spontaneously.

Of the two cases of prolapse, one, aged 37, had been married 5 years: there was prolapse of the uterus and vaginal walls. I introduced a ring pessary in January, 1906; in October, 1906, she was four months pregnant.

Of the 38 cases of mobile retroversion, 5 were over 40 years of age: of the remaining 33, 7 or 21·2 per cent. became pregnant to my knowledge, after treatment. There may have been others that I did not hear of; but 21 per cent. of favourable results following treatment is strong confirmatory evidence of the view that the displacement was the cause of the sterility.

Among my cases there was an interesting group of 10 patients who had uterine fibroids as well as retroversion: in 7 of them I operated. One, a patient aged 46, required a hysterectomy, but in the remaining six I was able to preserve the uterus, doing a myomectomy and hysteropexy. Two of them bore children afterwards, the cases being these:—

Case 56.—This patient was aged 35, and had been married 1 year. The uterus was retroverted and contained a large

fibroid in the anterior wall. At the operation the fibroid was enucleated, and the uterus was attached to the abdominal wall by hysteropexy. This was in December, 1914; in September, 1915, she became pregnant, and she had a normal confinement in June, 1916.

Case 57.—I saw this patient, who was aged 36, when she had been married 2 months. She sought advice on account of difficulty with intercourse; and on examination the vagina was found encroached upon and apparently shortened by a large fibroid in the posterior wall of the uterus, pressing down the pouch of Douglas. I did a myomectomy and hysteropexy in March, 1907; three months later she became pregnant, and she had a normal confinement on the anniversary of her operation.

### Ovarian Tumours and Sterility.

Rather widely divergent opinions have been expressed as to the influence of ovarian tumours on sterility; and authors have given and quoted statistics. Thus Kisch (1) quotes the following:

Boinet states that of 500 women with Ovarian tumours, 390 were childless—*i.e.*, 78 per cent.

Veil computed from the statistics of Lee, Scanzoni, and West that 34 per cent. of women with ovarian tumours were sterile.

Negroni found among 400 cases only 43 childless, *i.e.*, 10·7 per cent., and among these 400 were single as well as married women.

v. Scanzoni found among 45 patients 13 childless, or 28·8 per cent.

Nussbaum had only 1 childless in 21 cases, *i.e.*, 5 per cent.

Olshausen, 8 childless in 63 cases or 12·7 per cent.

These statistics are practically valueless, their defects being threefold:

First, they do not always distinguish between single and married women; secondly, they take no account of the age of the patients; thirdly, they do not specify the proportion of unilateral and bilateral

tumours. Wineke found among 150 cases of sterility 32 cases of ovarian tumour (22 per cent.): of these 32, 30 were one-sided tumours.

My own figures differ rather widely from these, as I had only 33 cases of ovarian tumour in 530 cases of sterility, that is, 6·2 per cent. Among the 33 were 19 unilateral and 14 bilateral tumours.

In order to form a correct idea of the subject we must consider, first, the age of the patients. Table IV. shows that among my 33 cases the ages were as follows:

| | | | | | |
|---|---|---|---|---|---|
| Under 24 | ... | ... | ... | ... | 8 cases. |
| ,, 25–29 | ... | ... | ... | ... | 7 ,, |
| ,, 30–34 | ... | ... | ... | ... | 7 ,, |
| ,, 35–39 | ... | ... | ... | ... | 5 ,, |
| ,, 40 and over | ... | ... | ... | | 11 ,, |

While it is permissible to assume that in the younger women the ovarian tumours may have been responsible for the sterility, in the case of the older ones, especially those over 40, it is almost certain that the sterility was due to other causes, since the tumours were a late development.

Or we may look at this question from the point of view of the duration of married life. Table V. shows that

| | | | | |
|---|---|---|---|---|
| 13 | patients | had been | married | 5 years or less. |
| 8 | ,, | ,, | ,, | 6–10 years. |
| 12 | ,, | ,, | ,, | over 11 years. |

These last 12 cases had certainly had a number of years of married life before their tumours developed, and therefore it is a fair assumption that the tumours were not the cause of sterility.

Then we have to consider whether the tumours were bilateral or unilateral.

*With bilateral tumours*, occurring in young women, we may quite properly suppose that the tumours cause sterility. Nevertheless, authentic cases have

been reported in which a woman with bilateral ovarian tumours became pregnant. Thus Holst relates a case of a woman aged 43 who died in the fifth month of pregnancy: at the autopsy the left ovary showed 3 cysts, each as large as an apple; on the right side was a tumour the size of a fist. No trace of ovarian parenchyma could be found on either side.

Spiegelberg records 2 cases: in one, a woman aged 36, who died shortly after her second confinement, both ovaries were carcinomatous or myxosarcomatous: in the other, a woman aged 42, who died 4 weeks after her eleventh confinement, both ovaries were transformed into cancerous tumours the size of a child's head. In neither case could any normal ovarian stroma be recognised. Ruge describes a case in which a woman aged 36, who aborted at the sixth month, had myxo-sarcoma of both ovaries: one weighed 5,620 grammes and the other 480 grammes (approximately 12 lbs. and 1 lb. respectively).

Kisch points out that, as is well known, malignant ovarian tumours may take on a rapid growth during pregnancy; and that in the above cases there may have been a sufficient amount of normal ovarian tissue to allow of ovulation taking place at the time that conception occurred. Pregnancy has, however, been known to occur in a woman with a double ovarian dermoid; a condition on whose rate of growth pregnancy would have little or no influence. I had an example of this in a young married woman aged 22: she had been confined 11 months previously and had bilateral ovarian dermoids, for which I operated. From the size of the tumours it was practically certain that she had them when she became pregnant.

*Unilateral ovarian tumours* probably have very little effect in producing sterility. An ovarian tumour

complicating pregnancy is not a very uncommon thing. In my own experience, of 434 unilateral ovariotomies, 15 were done during pregnancy, at different stages, as follows:- 6 weeks, 7 weeks, 2 months, 2½ months, 3 months (3 cases), 3½ months, 4 months (3 cases), 5 months (2 cases), 7½ months, and one case during labour. In another case the ovariotomy was on the 17th day after confinement. In addition, I have four times operated when there was an ovarian cyst on one side, and a tubal pregnancy on the other. Thus out of 434 cases of ovarian tumour there was simultaneous pregnancy in 20, or 4·6 per cent.

That the presence of only one healthy ovary is quite sufficient to allow of conception taking place is further shown by the fact, which is well known, that patients become pregnant after the removal of one ovary. In 1910 I was able to report (2) 34 cases of patients who became pregnant after the removal of one ovary, out of 125 patients operated upon in the child-bearing period, a proportion of just over 27 per cent.

Even a portion of an ovary left behind may be sufficient to allow of conception. The following interesting cases illustrate the value of this form of conservative surgery. I quote them here although they come under the category of "one-child sterility."

Case 58.—In May, 1911, I saw a woman aged 30, who had had one child 4 years previously. The complaint was of excessive losses at the periods, and on examination I found a smooth rounded swelling the size of an orange, to the right of the uterus. I operated and performed a right ovariotomy for a multilocular ovarian cyst. The left ovary was the seat of a small cyst and I resected this, removing about a half of the ovary. Incidentally, appendicectomy and hysteropexy were done. The patient subsequently had two normal confinements, namely in February, 1913, and in June, 1914. Both children were boys. Seven years after

the operation I saw her again; the left ovary felt normal, and the uterus was slung up in good position.

Case 59.—This patient was a sister of the one whose history is recorded as Case 30. She was 29 years of age, and had one child 13 months old. She gave a history of $1\frac{1}{2}$ months' pregnancy, with the usual sickness, but with unusual abdominal enlargement. On examination the uterus corresponded in size to a six weeks' pregnancy, but was pushed up into the abdomen by a swelling in the pouch of Douglas, diagnosed as a right-sided ovarian cyst. At the operation, right ovariotomy was done, for a multilocular ovarian cyst, the size of a fist. The left ovary was the seat of a cyst the size of a plum; this was resected, leaving about half the ovary, as in the previous case. The patient miscarried shortly afterwards, but became pregnant again, and had a normal confinement of a girl 15 months after the operation.

Case 59A.—I relate this third case of pregnancy following conservative surgery of the ovary, to show that the practice may have its drawbacks, as well as its advantages. The patient was a widow, aged 28, and had a child 6 years old. On examination she had a swelling the size of an orange behind and to the right of the uterus. At the operation this proved to be a small right ovarian cyst, and the right tube was inflamed and occluded. An ovariotomy was done, and the left ovary was then found to be cystic. The cyst was resected, as in the previous cases. Six months later the patient married again, and after a year and a half became pregnant. Unfortunately, this time the pregnancy was extra-uterine, and when I saw her she had severe intraperitoneal haemorrhage, as the result of rupture of the tube. She therefore had to undergo a second abdominal operation, from which, however, she made a good recovery.

We may sum up this section by saying that bilateral ovarian tumours usually cause sterility, and that unilateral ones do not.

### The Determination of Sex in Pregnancy.

*A propos* of these cases of pregnancy following the removal of one ovary, a short digression may be allowed. The question, "What is the influence that determines whether a pregnancy shall result in a

boy or girl ?" has always had an attraction for enquiring minds. Some have gone further and sought to discover whether a boy or girl might not be begotten at will; for, were this possible, no throne and no ancestral estate or title need fail to achieve a male heir.

Some of the theories are obviously fantastic; others are supposed to rest on a scientific basis. In 1900, Rumley Dawson (3), in putting forth a theory which he claimed to be new and original, set forth the following, as some of the theories that had been advanced :—

1. Due to age of parents.
2. Strength of parents.
3. Number of spermatozoa.
4. Night and morning coitus.
5. Side of wife you sleep on. (Left a female, right a male.)
6. Nutrition theories.

Geddes and Thomson (*Evolution of Sex*) say that a *katabolic* habit of body, *i.e.*, tendency for waste to exceed repair, leads to *males*. *Anabolic habit*, where construction or repair exceeds waste, leads to *females*. Attempts to prove this theory made on tadpoles !

Dr. Andrew Wilson, F.R.S.E. (*Lancet*, September 26, 1891, p. 713), thinks exactly the opposite—*anabolism* producing males, *katabolism* females.

Dawson's theory, which as one of the speakers in the discussion showed, could be traced back as far as 500 B.C., when Anaxagoras propounded it, was to the effect that the right ovary produced males and the left ovary produced females. On the face of it such a theory appears too artificial to command acceptance; surgery, however, allows us to put it to a conclusive test. In discussing the after-results of ovariotomy (4) I went into this question, as I had

records of a number of cases in which a child was born after the removal of one ovary. To the list which I then drew up I can now make some additions, the following being the complete list :

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | Left | side | removed. | Active | ovary : | Right | 1 boy and 2 girls. |
| 2. | Left | ,, | ,, | ,, | ,, | Right | 1 girl. |
| 3. | Right | ,, | ,, | ,, | ,, | Left | 1 boy. |
| 4. | Right | ,, | ,, | ,, | ,, | Left | 1 girl. |
| 5. | Right | ,, | ,, | ,, | ,, | Left | 1 girl. |
| 6. | Right | ,, | ,, | ,, | ,, | Left | 1 boy. |
| 7. | Right | ,, | ,, | ,, | ,, | Left | 1 boy. |
| 8. | Right | ,, | ,, | ,, | ,, | Left | 1 boy. |
| 9. | Right | ,, | ,, | ,, | ,, | Left | 1 girl. |
| 10. | Left | ,, | ,, | ,, | ,, | Right | 1 girl. |
| 11. | Right | ,, | ,, | ,, | ,, | Left | 2 boys. |
| 12. | Left | , | ,, | ,, | ,, | Right | 1 boy. |
| 13. | Right | ,, | ,, | ,, | ,, | Left | 1 boy. |
| 14. | Left | ,, | ,, | ,, | ,, | Right | 2 boys. |
| 15. | Left | ,, | ,, | ,, | ,, | Right | 2 boys. |
| 16. | Left | ,, | ,, | ,, | ,, | Right | 1 boy and 1 girl. |
| 17. | Left | ,, | ,, | ,, | ,, | Right | 1 girl. |
| 18. | Right | ,, | ,, | ,, | ,, | Left | 1 girl. |
| 19. | Left | ,, | ,, | ,, | ,, | Right | 1 girl. |
| 20. | Right | ,, | ,, | ,, | ,, | Left | 1 girl. |
| 21. | Right | ,, | ,, | ,, | ,, | Left | 1 boy. |
| 22. | Left | ,, | ,, | ,, | ,, | Right | 1 boy and 1 girl. |
| 23. | Right | ,, | ,, | ,, | ,, | Left | 1 girl. |
| 24. | Right | ,, | ,, | ,, | ,, | Left | 2 boys. |
| 25. | Right | ,, | ,, | ,, | ,, | Left | 1 girl. |

To these cases I may add a remarkable one in which I operated on a patient aged 37, the mother of 5 children, for adherent retroversion. On opening the abdomen I found a congenital absence of the right tube and ovary. The left ovary was therefore the source of all the children that the patient had borne. Three of them were boys and two were girls.

Thus the remaining or active right ovary produced only boys in 3 cases—5 boys between them ; and only girls in 4 cases—one each.

The remaining or active left ovary produced only

boys in 8 cases—10 boys between them; and only girls in 4 cases—one each.

The remaining or active right ovary produced both boys and girls in 4 cases, respectively 1 boy and 2 girls; 1 boy and 1 girl; 1 boy and 1 girl; and 3 boys and 2 girls.

There were no cases in this series in which the remaining or active left ovary produced both boys and girls.

Altogether 11 boys were produced from the right ovary and 15 boys from the left ovary; whilst 10 girls were produced from the right ovary and 7 girls from the left ovary.

Although the number of cases is not very large, they show conclusively, as far as they go, that Dawson's theory is untenable, and that there is no kind of relation between the side from which the ovum is derived and the sex of the embryo.

The secret of sex is undoubtedly one of those channels of investigation of which Nature has locked the door and lost or concealed the key.

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# CHAPTER XI

## Primary Sterility : B. Acquired Sterility (*contd.*). Fibroids and Sterility

It has long been recognised that there is a close relation between uterine fibroids and sterility, and also between fibroids and diminished fertility. Among the earlier writers on the subject in England, the United States, France, and Italy were West (1), Marion Sims (2), Lefour (3), and Pestalozza (4). In Germany, statistics were compiled by Gusserow (5), Winckel (6), Schorler, from materials in Schröder's clinic (7), and others. In 1890 Hofmeier (8) made an important contribution on the subject.

There are two ways of considering this question :

(1) In what proportion are fibroids present among cases of sterility ?

(2) In what proportion are married women suffering from fibroids sterile.

I will give some statistics under each head, and then consider the general question of the relation between fibroids and sterility.

(1) *In what proportion are fibroids present among cases of sterility ?*

Sims found that among 250 sterile women, 57, or 22·8 per cent., had fibroids. He also found that among 255 cases of "one-child sterility" fibroids were present in 38, or 14·8 per cent.

Among my 530 cases of sterility there were 78 cases of fibroids, or 14·8 per cent. I shall deal later

with secondary (including "one-child") sterility: but I may mention here, in view of Sims' figures, that among 295 cases of "one-child sterility" fibroids were present in 52, or 17·6 per cent., and among 172 cases of "two-children sterility," fibroids were present in 35, or 20·3 per cent.

Thus Sims found a higher proportion of fibroids among cases of primary sterility, and a lower proportion among cases of secondary sterility than my figures show. But in either case the figures have but little significance unless we analyse them further, and particularly with reference to two questions, namely the age of the patients and the number of years that they had been married.

From Table IV., which is tabulated according to the age of the patient when seen, we obtain the following:

| | | | | | | |
|---|---|---|---|---|---|---|
| Age 24 or under | 85 cases | .. | .. | .. | fibroids present in 0 cases or | 0·0% |
| 25 to 29 | 118 | .. | .. | .. | 3 .. | 2·5% |
| 30 to 34 | 155 | .. | .. | .. | 10 .. | 6·4% |
| 35 to 39 | 99 | .. | .. | .. | 11 .. | 11·1% |
| 40 and over | 123 | .. | .. | .. | 54 .. | 44·0% |

It is strikingly evident from these figures that up to the age of 30 the relation between fibroids and sterility is quite unimportant, as fibroids were present in only 2 cases in a hundred: but after 40 the association becomes startlingly intimate, fibroids being present in 2 cases out of every five.

Again, in Table V., which is tabulated according to the number of years that the patient had been married, we find these figures:

| | | | | | | |
|---|---|---|---|---|---|---|
| Patient married | | | | | | |
| 1 year: | 66 cases: | fibroids present in | | 4 cases, or | | 6% |
| 2–5 years: | 196 | .. | .. | .. | 9 .. | 4·5% |
| 6–10 .. | 142 | .. | .. | .. | 20 .. | 14·1% |
| 11 yrs. & over | 126 | .. | .. | .. | 45 .. | 35·8% |

Clearly fibroids do not play an important part in

relation to sterility in the early years of married life: among the 262 patients married not more than 5 years, fibroids were present in 1 case in every 20: but with patients married over 10 years they were present in 1 case in every three.

I will now take the second question.

(2) *In what proportion are married women suffering from fibroids sterile?*

To answer this question we have more statistics available because most authors appear to have approached the question from this standpoint.

I have been able to collect the following figures:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Michels | of | 127 | patients. | 26 or | 20 | per cent. | were sterile |
| Schuhmacher (9) | ,, | 114 | ,, | 24 ,, | 21 | ,, | ,, |
| West (1) | ,, | 80 | ,, | 20 ,, | 25 | ,, | ,, |
| Von Beigel | ,, | 86 | ,, | 21 ,, | 24 | ,, | ,, |
| Gusserow (5) | ,, | 564 | ,, | 153 ,, | 27 | ,, | ,, |
| Von Röhrig (10) | ,, | 75 | ,, | 31 ,, | 29 | ,, | ,, |
| Winckel (6) | ,, | 415 | ,, | 134 ,, | 32 | ,, | ,, |
| V. Flamerdinghe | ,, | 1385 | ,, | over | 32 | ,, | ,, |
| Schröder (7) | ,, | 604 | ,, | 204 or | 33 | ,, | ,, |
| McClintock | ,, | 21 | ,, | 10 ,, | 47 | ,, | ,, |
| Scanzoni | ,, | 60 | ,, | 38 ,, | 63 | ,, | ,, |

The figures in brackets after the names indicate the references at the end of the chapter The statistics of Michels, Von Beigel, Von Flamerdinghe, McClintock, and Scanzoni are quoted by Kisch (11).

I have not had access to V. Flamerdinghe's communication, but it is possible that his figures are obtained by grouping those of some other authors. If we omit his figures and group all the rest together, we find—

2,146 patients, of whom 661 or 30·8 per cent. were sterile. In order to compare these figures with my own experience, I have investigated all the cases of fibroids for which I performed an abdominal operation, up to the end of the year 1917. The diagnosis

of fibroids is not always a certainty: and I have selected this series because in all of them the diagnosis was verified by operation.

There were in all 881 cases, divided as follows:

Single: 271 or 30·8 per cent.
Married: 610 or 69·2 per cent.

Of the married women there were 54 of whom I have no note as to whether they had had children or not. Of the remaining 556,

395 or 71 per cent. had borne children, and
161 or 29 per cent. were sterile.

These figures agree closely with those quoted above, and if I add mine to them we have altogether records of 2,702 married patients with fibroids, of whom 822 or 30 per cent. were sterile.

The majority of writers have included fibroids among the causes of sterility, some assigning to them a relatively important influence. There is no doubt that they have an influence, but in my opinion only a slight one: and I will deal with it later. There is a converse aspect of the subject namely that *fibroids are not the cause, but the result of sterility: or, speaking more accurately, they are the result of the absence of pregnancy.* I first expressed this view in a paper (12) written in 1907. The data that led me to this conclusion were derived from the study of 150 cases of uterine fibroids; with a much larger number of cases to investigate, nearly 900, the results confirm in every respect the previous conclusions; and I will proceed to give the results of this further investigation.

*Absence of Pregnancy as a Cause of Uterine Fibroids.*

I stated above that of the 881 cases under consideration, 271, or 30·8 per cent., were single women. Of the married women there were 54 concerning

whom I had not full particulars. Omitting these, there were 556 married women of whom 161, or

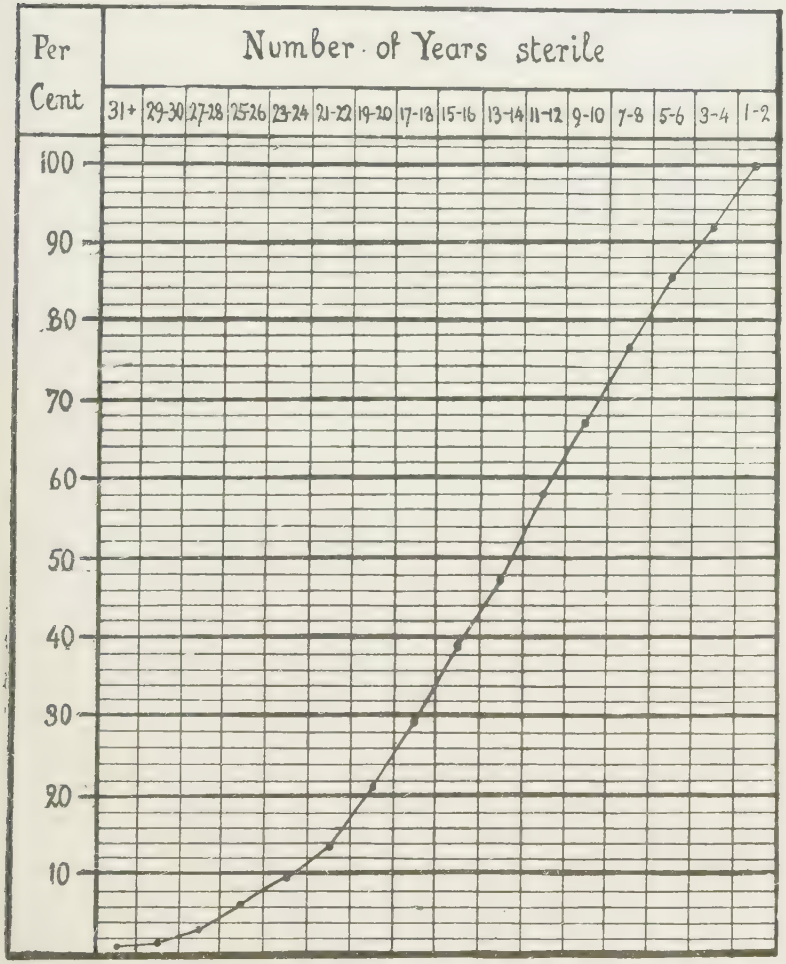


FIG. 8.—A chart to show the percentage of cases in which parous women suffering from fibroids had been sterile for successive periods of years.

29 per cent., had borne no children. We have, therefore, at the outset, this striking fact, that *in 60 per cent. of cases of fibroids the patient has not been pregnant.*

The length of time that the nulliparae had been married was as follows:

| | | |
|---|---|---|
| 1 to 5 years | ... | 25 cases. |
| 6 to 10 ,, | ... | 27 ,, |
| 11 to 15 ,, | ... | 15 ,, |
| 16 to 20 ,, | ... | 16 ,, |
| 21 to 25 ,, | ... | 12 ,, |
| Over 25 ,, | ... | 4 ,, |
| Total | ... | 99 |
| Time not stated | ... | 62 |
| Total cases | ... | 161 |

From this we elucidate two facts; first that these patients had been married long enough to have a chance of pregnancy, since 75 per cent. of those in whose case the time is stated had been married over 5 years; and 47 of them over 10 years. Secondly, that the great majority of them had been married a long time before the fibroids developed, for there were very few cases in which the fibroid history went back more than 3 to 5 years. Therefore they were not sterile because they had fibroids; but they support my contention that they developed fibroids because they had not become pregnant.

When we investigate the cases of women who had borne children we obtain some interesting and striking results. One patient was in labour at the time of operation: 5 were pregnant; in 61 the time that had elapsed since the last pregnancy was not stated. Deducting these 67 cases from the 395 who had borne children, we have 328 cases concerning whom we have particulars as to the time that had elapsed since the last pregnancy. They are as follows:

| | | | | | |
|---|---|---|---|---|---|
| 1 year | 18 cases | | 16 years | 18 cases |
| 2 years | 11 ,, | | 17 ,, | 12 ,, |
| 3 ,, | 9 ,, | | 18 ,, | 14 ,, |
| 4 ,, | 10 ,, | | 19 ,, | 17 ,, |
| 5 ,, | 18 ,, | | 20 ,, | 8 ,, |
| 6 ,, | 10 ,, | | 21 ,, | 7 ,, |
| 7 ,, | 15 ,, | | 22 ,, | 7 ,, |
| 8 ,, | 15 ,, | | 23 ,, | 6 ,, |
| 9 ,, | 15 ,, | | 24 ,, | 4 ,, |
| 10 ,, | 16 ,, | | 25 ,, | 6 ,, |
| 11 ,, | 15 ,, | | 26 ,, | 3 ,, |
| 12 ,, | 22 ,, | | 27 ,, | 2 ,, |
| 13 ,, | 10 ,, | | 28 ,, | 5 ,, |
| 14 ,, | 18 ,, | | 30 ,, | 1 ,, |
| 15 ,, | 12 ,, | | over 30 ,, | 4 ,, |

An instructive way to consider these figures is to put down the number of patients who had been sterile for successive periods of years, and the percentage of each number to the whole. In order to make the figures less cumbersome, I will take them for two years at a time. As the list begins with the longest periods, working down to the shortest, each group of two years naturally includes all the preceding groups.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sterile for over 30 years | | | 4 cases | out of | 328 | or | 1·2 per cent. |
| ,, | 29–30 | ,, | 5 | ,, | ,, | 1·5 | ,, |
| ,, | 27–28 | ,, | 12 | ,, | ,, | 3·6 | ,, |
| ,, | 25–26 | ,, | 21 | ,, | ,, | 6·4 | ,, |
| ,, | 23–24 | ,, | 31 | ,, | ,, | 9·4 | ,, |
| ,, | 21–22 | ,, | 45 | ,, | ,, | 13·7 | ,, |
| ,, | 19–20 | ,, | 70 | ,, | ,, | 21·3 | ,, |
| ,, | 17–18 | ,, | 96 | ,, | ,, | 29·2 | ,, |
| ,, | 15–16 | ,, | 126 | ,, | ,, | 38·4 | ,, |
| ,, | 13–14 | ,, | 154 | ,, | ,, | 47·0 | ,, |
| ,, | 11–12 | ,, | 191 | ,, | ,, | 58·2 | ,, |
| ,, | 9–10 | ,, | 222 | ,, | ,, | 67·6 | ,, |
| ,, | 7–8 | ,, | 252 | ,, | ,, | 76·8 | ,, |
| ,, | 5–6 | ,, | 280 | ,, | ,, | 85·3 | ,, |
| ,, | 3–4 | ,, | 299 | ,, | ,, | 91·2 | ,, |
| ,, | 1–2 | ,, | 328 | ,, | ,, | 100·0 | ,, |

To illustrate these facts in a graphic manner I have put them in the form of a chart (Fig. 81) which is sufficiently self-explanatory.

Grouping the figures somewhat, we get these results:

| | | | |
|---|---|---|---|
| 1 to 4 | years since last pregnancy | 48 | cases. |
| 5 to 9 | .. .. | 73 | .. |
| 10 to 14 | .. .. | 81 | .. |
| 15 to 19 | .. .. | 73 | .. |
| 20 to 24 | .. .. | 32 | .. |
| 25 and more | .. .. | 21 | .. |

This means that there had been no pregnancy for at least

| | | | | | |
|---|---|---|---|---|---|
| 5 | years in | 280 | cases or | 85·3 | per cent. |
| 10 | .. | 207 | .. | 63·1 | .. |
| 15 | .. | 126 | .. | 38·4 | .. |
| 20 | .. | 53 | .. | 16·1 | .. |
| 25 | .. | 21 | .. | 6·4 | .. |

The outstanding feature of these cases is again this: that fibroids are associated with the absence of pregnancy for a number of years: no fewer than 63 per cent. of those women who had borne children having had no pregnancy for at least 10 years.

If we group these cases now with the single women and the nulliparae, we see that 60 per cent. of all cases of fibroids have never been pregnant, and of the remaining 40 per cent., a further 63 per cent., or 25 per cent. of the whole, have not been pregnant for at least 10 years: and the remarkable final conclusion is reached that *in 85 per cent. of cases of fibroids the patient either has not been pregnant at all, or has had no pregnancy for at least* 10 *years.*

On reference to my original paper, I find that the figure arrived at was 84 per cent.; so the results of the larger number of cases give a strikingly similar conclusion. Let me now emphasize the lessons

learnt from Tables IV. and V., which I mentioned earlier in this chapter.

First, the age-question: 308 of my "sterile" patients were under 35 years of age, that is, they were of an age most favourable to pregnancy: Fibroids were present in 13 cases, or 4·2 per cent.

222 patients were over 35 years of age; and among them fibroids were present in 65 cases, or 25 per cent. The conclusion seems inevitable that in the case of the younger women, if they did not become pregnant, it was not the presence of fibroids that hindered them; for only one patient in 25 had fibroids. But among the older women the chances of pregnancy had escaped with the years, and 1 patient in every 4 of those who passed the age of 35 developed fibroids.

And if it be said, "But had they been married long enough to have the chance of pregnancy?" the answer comes in this form: 262 patients had been married from 1 to 5 years—long enough to have the chance of pregnancy, and among them fibroids were present in 13 cases, or 5 per cent. Again, it was clearly not the presence of fibroids that precluded pregnancy. But, as the years of married life increased, and no pregnancy was forthcoming, fibroids manifested themselves with greater frequency; those who were married 6-10 years showed fibroids in the proportion of 14·1 per cent., or 1 in 7; and those who had been married 11 years or more had fibroids in the proportion of 35·8 per cent., or 1 in every 3.

### The Age-Incidence of Fibroids.

This matter has an interesting and instructive bearing on the question of the absence of pregnancy in relation to fibroids. I have analysed the ages of all my cases of fibroids, with the result shown in Table X.

TABLE X.—THE AGE-INCIDENCE OF FIBROIDS.

| Age. | Single women. | | Nulliparae. | | Parae. | | Parity doubtful. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Up to 24 .. | 4 | 1·4 | 0 | 0·0 | 0 | 0·0 | 0 | 0·0 | 4 | 0·4 |
| 25 to 29 .. | 14 | 5·2 | 14 | 8·7 | 7 | 1·7 | 0 | 0·0 | 35 | 4·0 |
| 30 to 34 .. | 37 | 13·7 | 29 | 18·1 | 40 | 10·1 | 5 | 9·3 | 111 | 12·6 |
| 35 to 39 .. | 64 | 23·8 | 37 | 23·0 | 65 | 16·4 | 9 | 16·6 | 175 | 20·0 |
| 40 to 44 .. | 65 | 24·1 | 40 | 24·7 | 114 | 28·9 | 13 | 24·1 | 232 | 26·4 |
| 45 to 49 .. | 57 | 21·1 | 25 | 15·5 | 114 | 28·9 | 12 | 22·2 | 208 | 23·6 |
| 50 to 54 .. | 21 | 7·7 | 8 | 5·0 | 36 | 9·2 | 11 | 20·4 | 76 | 8·6 |
| 55 and over | 8 | 3·0 | 8 | 5·0 | 19 | 4·8 | 4 | 7·4 | 39 | 4·4 |
| Total .. | 270 | 100·0 | 161 | 100·0 | 395 | 100·0 | 54 | 100·0 | 880 | 100·0 |

In order to convey the teachings of this table in a graphic form, I have put them in the form of a chart (Fig. 9). The continuous line gives the curve of the age-incidence of fibroids in general: the dotted line is the curve for single women: the interrupted line, nulliparae: and the line of dots and dashes, women who have borne children.

The table and chart show a striking tendency to the development of fibroids at an earlier age in nulliparae than in single women: and at an earlier age in single women than in parous women.

In this series, the only women with fibroids under the age of 25 were single: but apart from this, we see that—

8·7 per cent. of the nulliparae
6·6 ,, ,, single women } were under the age of 30.
1·7 ,, ,, parae

18·1 per cent of the nulliparae
13·7 ,, ,, single women } were 30 to 34 years of age.
10·1 ,, ,, parae

23·0 per cent. of the nulliparae
23·8 ,, ,, single women } were 35 to 39 years of age.
16·4 ,, ,, parae

After the age of 40 the proportions are in the reverse order.

In other words the percentage of all the cases under 35 was

| | | |
|---|---|---|
| Nulliparae | 26·8 | all cases 17·0 |
| Single women | 20·3 | |
| Parous women | 11·8 | |

while the percentage of all the cases under 40 was

| | | |
|---|---|---|
| Nulliparae | 49·8 | all cases 37·0 |
| Single women | 44·1 | |
| Parous women | 28·2 | |

The only satisfactory explanation of these figures is that women have developed fibroids because they have not become pregnant; and I will quote the conclusion at which I arrived in the paper previously referred to:

"It is a warrantable inference that fibroids arise in default of the normal function of the uterus—namely, pregnancy—and that the *modus operandi* may be that the periodic congestion of the uterus in preparation for this function expends itself, if continually thwarted, in pathological, irregular, and permanent, instead of physiological, uniform, and temporary, hypertrophy. After the menopause, when periodic congestion no longer occurs, the liability to the onset of fibroids ceases. The pathological revenge of defeated physiological purpose is not usually precipitate; from 20 to 30 years of grace are allowed for response to the physiological call. The uterus that could not become pregnant, through under-development or through deficient ovarian activity, is commonly exempt. The uterus that could have become pregnant, but has not done so, is the one that pays the penalty."

The later age-incidence of fibroids among women who have borne children is explicable on the above supposition: the uterus having occupied itself with child-bearing, the tendency to the development of fibroids is minimised and delayed. With single women, this delaying factor is absent, and so they develop fibroids earlier. With childless married women, not only is the delaying factor absent; there is, in addition, an aggravating factor present, namely the uterine excitation incidental to sexual

intercourse. When this is taking place frequently without the natural outlet of a consequent pregnancy, the conditions are the most favourable for the development of fibroids.

This view is confirmed by another consideration. Although I have no definite figures on the subject I

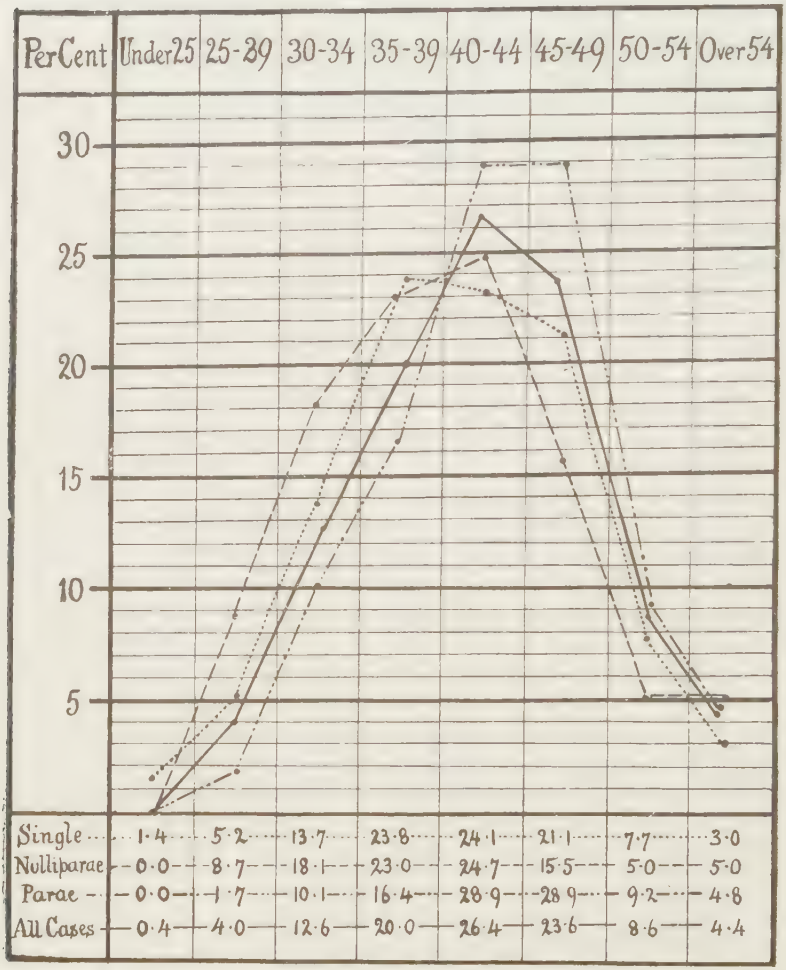


FIG. 9. -A chart to show the age incidence of fibroids. (1) In single women: dotted line; (2) in nulliparae: interrupted line; (3) in parous women: dotted and interrupted line; (4) in all cases: continuous line.

think there is no doubt that childless married women form a small proportion of all the women in the community. If we assume that among all women from 30 to 40 years of age there are about an equal number of single and married women; and if we reckon the childless marriages as 20 per cent. (an outside figure), then childless married women would constitute 10 per cent. of all women between 30 and 40; yet, as we have seen, they supply 30 per cent. of all cases of fibroids. The deduction is that fibroids are about 3 times more common among childless married women than among single and fruitful women.

So much for the question of fibroids in relation to the absence of pregnancy.

I will now make a few observations on the subject of

### Fibroids and Pregnancy.

Although the absence of pregnancy predisposes to fibroids, it does not follow that women who are having children with average frequency are entirely exempt; I note among my cases of fibroids the following examples:—

Age 30: 2 children, youngest 2 years; 1 miscarriage a year ago.
Age 32: 2 children, youngest 6 months old.
Age 32: 6 children and 1 miscarriage; last pregnancy 1 year ago.
Age 33: 3 children—youngest 2 years old.
Age 33: 5 children, youngest 3 years old.
Age 36: 6 children, and 1 miscarriage; last pregnancy 9 months ago.

Even women who have had a considerable number of pregnancies are not exempt. Thus I find the following 27 instances of more than 6 pregnancies:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7 | pregnancies | 8 | cases | 12 | pregnancies | 1 | case |
| 8 | ,, | 4 | ,, | 13 | ,, | 1 | ,, |
| 9 | ,, | 2 | ,, | 14 | ,, | 1 | ,, |
| 10 | ,, | 5 | ,, | 15 | ,, | 1 | ,, |
| 11 | ,, | 4 | ,, | | | | |

These exceptions are not, however, numerous enough to invalidate the general rule.

We may now pass on to consider the question—

What is the Effect of Fibroids on Pregnancy?

I have already expressed my view that fibroids do not cause sterility: and I will now qualify that statement by saying that they do so in only a very small proportion of cases, those, namely, in which the tumour is intra-uterine or polypoid: those in which the pelvis is so filled up by the tumours that intercourse is not possible: those in which the tumors have led to secondary changes in the tubes; and cases of cervix fibroids.

In other cases, pregnancy can take place in a uterus that is the seat of fibroids. I have notes of the following cases of fibroids observed during or shortly after pregnancy:—

Age 34: 3 children, youngest 6 years: now pregnant.
Age 37: now pregnant for the first time.
Age 33: 1 child, aged 7 months: now pregnant.
Age 35: 1 child, aged 7 years; now pregnant.
Age 42: 2 children, youngest 10 years: now pregnant.
Age 29: 1 child and 1 miscarriage, last 4 years ago: now pregnant.
Age 31: 1 child, now in labour.
Age 29: 2 miscarriages, the last a month ago.
Age 35: 1 miscarriage, a month ago.
Age 34: 4 children, the last 2 months ago.
Age 35: 2 miscarriages, the last 4 months ago.

In several of the pregnant cases I operated, enucleating the fibroid, and the pregnancy went on to full time.

There is no doubt that *fibroids are associated with diminished fertility.* I find the number of pregnancies in such of my cases as give the necessary data, to be as follows :—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | pregnancy | 106 | cases | 9 | pregnancies | 2 | cases |
| 2 | ,, | 95 | ,, | 10 | ,, | 5 | ,, |
| 3 | ,, | 72 | ,, | 11 | ,, | 4 | ,, |
| 4 | ,, | 39 | ,, | 12 | ,, | 1 | ,, |
| 5 | ,, | 28 | ,, | 13 | ,, | 1 | ,, |
| 6 | ,, | 19 | ,, | 14 | ,, | 1 | ,, |
| 7 | ,, | 8 | ,, | 15 | ,, | 1 | ,, |
| 8 | ,, | 4 | ,, | | | | |
| | | | | Total | | 386 | |

Thus 27.4 per cent. of the patients had had only 1 pregnancy ; this is certainly a larger proportion than would be found in the community at large : 51.8 per cent. had had only one or two pregnancies ; and 70.7 per cent. had had not more than three pregnancies. It must be remembered that these figures do not prove that fibroids *caused* the few pregnancies ; there is the other, and, as I think, the correct interpretation, that because these patients ceased bearing children after 1, 2 and 3 pregnancies, they were predisposed to develop fibroids.

If fertility be taken to mean, not merely conceiving, but the bearing of full-time children, we can bring a direct charge against fibroids of impairing fertility. For there is no doubt that fibroids play an important part in inducing miscarriages.

Kisch (*op. cit.*) quotes the following: Toltschinow collected in literature 119 cases of pregnancy and fibroids : 21 ended in abortion. Röhrig found 128 abortions out of 147 pregnancies. Of my 386 patients no fewer than 95 had had one or more miscarriages, that is 1 in every 4, certainly a much larger proportion than the normal.

Altogether these 386 patients had between them

1,031 pregnancies, of which 169 or 16.4 per cent. ended in miscarriages; this again is a much larger proportion than is found in the community at large.

In going through the records of cases one meets a striking number in which a miscarriage has occurred a number of years after the birth of the last full-time child. These are some instances:—

Age 41: 1 child, aged 7; 2 miscarriages, the last 5 years ago; interval between child and miscarriage 2 years.
Age 37: 3 children, youngest 9 years; 1 miscarriage, 6 years; interval 3 years.
Age 34: 2 children, 13 years; 3 miscarriages, 8 years; interval, 5 years.
Age 37: 1 child, 8 years; 1 miscarriage, 6 months; interval $7\frac{1}{2}$ years.
Age 51: 2 children, 17 years; 1 miscarriage, 7 years; interval 10 years.
Age 41: 7 children, 12 years; 3 miscarriages, 9 months; interval 11 years.
Age 49: 3 children, 23 years; 1 miscarriage, 12 years; interval 11 years.
Age 51: 5 children, 18 years; 1 miscarriage, 7 years; interval 11 years.
Age 43: 3 children, 16 years; 1 miscarriage, 4 years; interval 12 years.
Age 61: 3 children, 24 years; 7 miscarriages, 12 years; interval 12 years.
Age 43: 1 child, 23 years; 2 miscarriages, 9 years; interval 14 years.

It is a probable explanation that these patients, having had no pregnancy for a number of years, developed fibroids; conception then occurred, and, owing to the presence of the fibroids, the pregnancy terminated in a miscarriage. Probably some of the patients in the list, such as the one aged 61, had a succession of miscarriages as the result of the fibroids.

The commonest time for a miscarriage, induced by fibroids, to take place is the third or fourth month.

### Uterine Fibrosis and Sterility.

Pathologically, fibrosis of the uterus is allied to endometritis, since it is the result of metritis affecting all the tissues of the uterine wall in such a way that the muscular tissue is largely replaced by fibrous tissue.

Clinically, fibrosis resembles uterine fibroids in that it causes haemorrhage; and, indeed, it is not always possible to determine before operation whether the uterus is the seat of fibroids or of fibrosis. So the condition is conveniently referred to here.

When fibrosis is present it causes sterility; chiefly because the endometrium becomes atrophied and virtually disappears. It is doubtful whether the spermatozoa could overcome such an obstacle to their ascent to the tubes; but they if did, and an ovum became fertilised, the oösperm could not effect an attachment to the uterine wall and would get washed away in the next flow of blood. The condition is irremediable from the point of view of the restoration of function; and therefore the prognosis as regards sterility is hopeless.

### Carcinoma of the Uterus and Sterility.

This subject need not detain us long. Carcinoma of the uterus is of two distinct types: Cancer of the body and cancer of the cervix.

*Cancer of the body of the uterus* necessarily causes sterility. The growth is in the uterine cavity, where it would obstruct the passage of spermatozoa; and moreover the morbid discharge due to the growth would kill any spermatozoa brought in contact with it. From the point of view of sterility, cancer of the body of the uterus plays a quite unimportant part for two reasons: first that it hardly ever develops until a woman is past the child-bearing age: sec-

ondly, that it is found chiefly in single women and in nulliparae who have been married a long time.

*Cancer of the Cervix* is not a cause of primary sterility, for the sufficient reason that it is practically never found except in women who have already borne children.

It may, however, be a cause of secondary sterility; and we shall have a little to say about it when considering that question.

*Sarcoma of the Uterus*, which is a rare disease, occurs in conditions similar to those of cancer of the body of the uterus, and what has been said of the latter applies equally to the former.

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## CHAPTER XII

### Secondary Sterility.

It may be well to recall here the definition of different forms of sterility, in the sense in which the terms are used in this book.

*Primary sterility* means that a woman, though married during the period of sexual maturity, has never been pregnant. Primary sterility is of two kinds.

*Congenital sterility*, where the patient from the first, or at least from the beginning of sexual life, has had some condition causing sterility.

*Acquired sterility*, where the patient was normal and potentially fertile at first, but before she has had the chance of becoming pregnant, has developed some condition causing sterility.

*Secondary sterility* means that a woman has borne one or more children, and has thereafter become sterile. It is this group that we have to consider now.

Now it may happen that a woman has had no children for a number of years; and one might suppose that she had become secondarily sterile. Nevertheless she may become pregnant again after quite a considerable time. We may call this

### Temporary Secondary Sterility.

Among my notes I have found the following instances of this condition:

*Four Years' Interval.*

Case 60.—This patient was 31 years of age, and had had 3 children when I saw her; the youngest was 3½ years old. She had a retroversion, which was treated by reposition, and the introduction of a Hodge pessary in March, 1908. She became pregnant during the following month, and was confined in January, 1909. The case is a good illustration of the influence of retroversion in preventing conception.

*Five Years' Interval.*

Case 61.—A woman, aged 38, had had 1 child, 5 years old. When I saw her she was 3 months pregnant, the pregnancy being complicated by an ovarian tumour which proved to be a dermoid. The operation of ovariotomy was done without delay and pregnancy went on to full term.

*Six Years' Interval.*

Case 62.—The patient was 36 years old, and had one child, aged 6 years. I found that she was 4 months pregnant. There was no evident reason for the absence of pregnancy in the interval.

Case 63.—A woman, aged 31, had had 2 pregnancies, namely a child 8 years old, and a miscarriage 6 years later. When I saw her she had an unruptured tubal pregnancy of about 6 weeks' duration, on the right side, complicated by a retroversion, and some small uterine fibroids. The diagnosis was verified by operation, when the right appendages were removed; myomectomy and hysteropexy were done at the same time.

Case 64.—A woman, aged 33, with one child 6 years old, came with a history pointing to extra uterine pregnancy; she had swellings on both sides of the uterus. At the operation she was found to have a ruptured tubal pregnancy on the left side and an ovarian cyst on the right.

*Seven Years' Interval.*

Case 65.—This patient was 39 years of age, and had borne 1 child, 7 years ago. When I saw her she was 5 months pregnant. It is interesting to note that she had been married 14 years; so that 7 years of sterility had preceded each of her pregnancies.

Case 66.—This was a woman aged 34, who had had 2 children, the younger being 7 years old. She was suffering

from endometritis, which appeared to be the cause of her temporary acquired sterility; for she was treated by applications to the cervix and ichthyol tampons from November 17 to December 17, 1900, and she conceived very soon after, for in March, 1901, she was 4 months pregnant.

Case 67.—This patient was also 34 years of age; she had had 3 children, the youngest being 7 years old. In this time she had suffered from "womb trouble": she had worn a pessary for prolapse and had been curetted. She had had a discharge up to 4 months ago, since when it had cleared up. She had apparently had endometritis. When I saw her she was 3½ months pregnant.

Case 68.—This was a woman aged 39; she had had 2 pregnancies, the first resulting in a living child, and the second ending in a miscarriage, with 7 years' interval between them. She was in good health and was anxious to have a child. There was no evident reason for the long delay between the pregnancies, nor for the miscarriage, which was 2 years ago, nor for the absence of pregnancy since; the pelvic organs appeared to be quite normal.

*Eight Years' Interval.*

Case 69.—A patient, aged 38, had had two children, the younger being 9 years old, followed 8 years later by a miscarriage. The second confinement was a bad one, accompanied by a postpartum haemorrhage; and when I saw her she was suffering from endometritis.

Case 70.—This patient was 44 years of age, and had had 1 child, now 8 years old. When I saw her she was 6 months pregnant. The case is striking in view of the age at which she started her second pregnancy, after such a considerable lapse of time.

Case 71.—The patient was aged 35; she had had 2 pregnancies, the first of which had gone to term, whilst the second ended in a miscarriage. Eight years elapsed between the two. I have no note of the uterine condition, as she came on account of an abscess in the anterior vaginal wall, communicating with the urethra.

Case 72.—I saw this patient, who was 37 years of age, 2 weeks after her second confinement, on account of febrile symptoms which turned out, however, to be independent of her pelvic organs. Eight years had elapsed between her two confinements.

Case 73.—This patient was aged 27, and therefore younger than most of those in this series. She had had one child when she was 19; 7 weeks before I saw her, she began, when 2 weeks over her time for menstruation, to have a slight loss of blood associated with abdominal pain on the right side. A definite enlargement on this side, felt through the vagina, led to a diagnosis of extra-uterine pregnancy, which was confirmed by operation a fortnight later.

*Nine Years' Interval.*

Case 74.—The patient was 36 years of age, and had 2 children, the first 11 years old, and the second nearly 2 years old. She had not been well since the second confinement, and had worn a pessary for some months. There was no evident abnormality of the pelvic organs.

*Ten Years' Interval.*

Case 75.—This was a woman aged 33, who had had 2 children; the last confinement was 10 years ago. When I saw her she had the typical symptoms and signs of retroversion of the gravid uterus, at 2½ to 3 months. A digital reposition was carried out, and the pregnancy continued without interruption.

Case 76.—This patient, aged 40, had had 2 children, the younger one being 10 years old. When I saw her she was 3 months pregnant. There was nothing in the history nor in the condition of the pelvic organs to explain why she had had to wait 10 years for her third pregnancy.

Case 77.—This patient had a history very similar to the previous one; she was 37 years of age and had 2 children, the younger one 10 years old. The uterus was the size of a 3½ months' pregnancy, and everything appeared normal. She had had no particular ill-health in the interval.

Case 78.—When I first saw this patient, she was aged 30, and had 1 child aged 10 years old. She had the symptoms and signs of extra-uterine pregnancy on the right side, for which I operated. No further pregnancy occurred for over 4 years, and she then developed an extra-uterine pregnancy on the left side, which was also confirmed by operation. No explanation was forthcoming of her 10 years of sterility, nor of the fact that on both occasions when she became pregnant later the pregnancy was extra-uterine.

Case 79.—The patient was 42 years old, and had had 2

children, the younger one 10 years old. She became pregnant again, but in the meantime she had developed some fibroids of such a character that it was not deemed safe to allow the pregnancy to proceed, and hysterectomy was done.

*Eleven Years' Interval.*

Case 80.—The patient, who was aged 49, had had 3 children, the youngest 23 years of age; after an interval of 11 years without pregnancy she had a miscarriage. When I saw her she had a large cervix-fibroid. It is possible that she had a fibroid when she miscarried, and that the tumour was the cause of the miscarriage, as pointed out in Chapter XI. This case is, in fact, one of those quoted in the list on page 136.

Case 81.—The woman was 38 years old, and had had one child 11 years previously. When I saw her she was 7 months pregnant. She gave a history of having suffered from prolapse for 5 years, and this may well have been a contributory cause of the absence of pregnancy, because even with the 7 months' pregnancy the cervix was very large and ulcerated, protruding completely from the vulva.

Case 82.—This patient, aged 40, had had 2 children, the last confinement 11 years previously. There was no explanation of the years of childlessness; when I saw her she was 4 months pregnant. The uterus was markedly irregular, and suggested the possibility of a fibroid complicating the pregnancy. However, she had a normal confinement at full time.

Case 83.—This was a young woman of 32, who had had her second baby at the age of 21. After that she suffered from retroversion, which no doubt proved unfavourable to conception. At the time of her visit she had retroversion of the gravid uterus at 2 months. The uterus was replaced digitally, and a Hodge pessary put in. Six weeks later, as everything was normal, the pessary was removed.

Case 84.—The patient was 46 years of age, and had had 4 children, the youngest 18 years old; then after a lapse of 11 years she had a miscarriage. There was no explanation either of the secondary sterility or of the miscarriage.

*Thirteen Years' Interval.*

Case 85.—This patient was 40 years of age, and had 2 children, the younger one being 13 years old. When I

saw her she was 6 months pregnant, and had vaginitis. The latter was probably recent, and therefore of no significance in trying to explain her long interval without pregnancy.

*Fifteen Years' Interval.*

Case 86.- The patient was 46 years of age when I saw her, and had had one child 21 years ago, and a miscarriage 6 years ago. She was suffering from retroversion, which might be held to explain both the long period of infertility and the occurrence of a miscarriage when at length pregnancy did take place again.

*Seventeen Years' Interval.*

Case 87.- This patient, aged 40, had had 2 children, the last one born 17 years ago. This is the longest interval between two successive pregnancies that I have met with. Unhappily, her third pregnancy was an unfortunate one, as it was extra-uterine. The diagnosis made when I saw her was confirmed by operation a week later. In addition to the right tubal pregnancy she had a hydrosalpinx and ovarian cyst on the right side. Inasmuch as chronic tubal disease is a predisposing cause of extra-uterine pregnancy, it is probable that this factor also played a part in causing her secondary acquired sterility.

Among the cases in this series, two points are of special interest.

The first is the frequency with which a pregnancy coming on after many years' interval ended in a miscarriage; no doubt in some of the cases the same cause which proved inimical to conception was also unfavourable to the normal development of the pregnancy.

The second is the striking fact that, in 5 cases out of this series of 29, when pregnancy took place after a long interval, it was extra-uterine. It is, however, well-known that among cases of extra-uterine pregnancy a large proportion shew a considerable lapse of time since the previous pregnancy.

It is evident, after going through this list, that some caution must be exercised in pronouncing that a patient, who has had no pregnancy for a number of years, has become sterile. Indeed, such a statement should certainly not be made without examining the patient. We shall find in our review of cases of secondary sterility that two kinds of condition are present: in one group the condition is obviously such as to preclude further pregnancy, for example tubal disease; in the other group the pelvic organs may be normal, or there may be some condition that is unfavourable to pregnancy, but does not preclude it.

I found among my notes 575 cases that might be described broadly as cases of "Secondary Sterility." I included no cases in which there had been more than 4 pregnancies. Even cases where there had been 3 or 4 pregnancies cannot, of course, be considered as of great importance from the point of view of sterility; and cases in which less than 5 years had elapsed since the last confinement might be regarded as rather doubtful cases. After reviewing the general results I shall eliminate the cases of 3 and 4 pregnancies, and those in which less than 5 years had elapsed.

In Table XI. I have tabulated the cases so as to show the relative frequency with which different conditions were found; and I have included the list of nulliparae from Tables IV.-VI., in order to compare the frequency of different conditions in the two groups.

From this table we see that the proportion of apparently normal cases is a little higher in secondary sterility; and this is not surprising, because some of them may be instances of temporary secondary sterility.

Then there is a group of conditions that occur in

primary but not in secondary sterility, because they are either congenital or associated with absence of intercourse: they account altogether for 31·6 of the cases of primary sterility, or nearly 1 in 3. Next there is a group of conditions that only occur in secondary sterility, because they are the result of labour, namely prolapse and procidentia, and bad tears of the cervix: they make up 12·5 per cent. of cases of secondary sterility, or 1 in 8.

TABLE XI. SHOWING THE PROPORTIONATE OCCURRENCE OF DIFFERENT CONDITIONS IN PRIMARY AND IN SECONDARY STERILITY.

| Present Condition. | Primary Sterility Tables IV.–VI. | | Secondary Sterility. | |
|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. |
| Apparently normal .. | 63 | 11·9 | 86 | 14·9 |
| Anteflexion and stenosis .. | 128 | 24·1 | — | — |
| Malformations .. .. | 10 | 1·9 | — | — |
| Vaginismus or no coitus .. | 24 | 4·5 | — | — |
| Premature menopause .. | 6 | 1·1 | — | — |
| Prolapse and procidentia .. | — | — | 41 | 7·1 |
| Badly torn cervix .. .. | — | — | 31 | 5·4 |
| Miscellaneous .. .. | — | — | 16 | 2·9 |
| Endometritis .. .. | 53 | 10·0 | 85 | 14·7 |
| Tubal Disease .. .. | 58 | 10·9 | 65 | 11·3 |
| " Peritonitis " .. .. | 23 | 4·4 | 12 | 2·1 |
| Retroversion .. .. | 54 | 10·2 | 69 | 12·0 |
| Ovarian tumours .. .. | 33 | 6·2 | 45 | 7·8 |
| Fibroid tumours .. .. | 78 | 14·8 | 125 | 21·8 |
| Total .. .. .. | 530 | 100·0 | 575 | 100·0 |

Endometritis is more frequent in the secondary group; and this may be explained by the fact that a certain number of cases of endometritis are the result of puerperal infection.

Tubal disease presents much the same proportion in both groups, leading one to the reflection that many men do not settle down to monogamy when

they marry. It is an unfortunate fact that there are men who are not capable of the restraint of celibacy while their wives are recovering from the effects of confinement ; such an one will go away and contract gonorrhoea, and then come home and infect the mother of his newly-born child ! We may perhaps recall, in mitigation of this charge, that, as mentioned in Chapter IX., the infection may have occurred at the time of the first impregnation, and the tubal inflammation may have become lighted up as a sequel of labour.

Retroversion shows a slightly higher proportion in cases of secondary sterility : this may be explained by the fact that the relaxation of the uterine ligaments incidental to pregnancy is one of the predisposing causes of retroversion.

Fibroid tumours occur in a markedly higher proportion in the secondary sterility group : this is probably because the age of patients in this group ranges higher than in the primary group. The ages are as follows :—

| Age. | Primary Sterility. | | Secondary Sterility. | |
|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. |
| 24 or under .. .. | 35 | 6·6 | 7 | 1·2 |
| 25 to 29 .. .. .. | 118 | 22·3 | 53 | 9·2 |
| 30 to 34 .. .. .. | 155 | 29·2 | 113 | 19·7 |
| 35 to 39 .. .. .. | 99 | 18·7 | 129 | 22·4 |
| 40 and over .. .. | 123 | 23·2 | 273 | 47·5 |
| Total .. .. .. | 530 | 100·0 | 575 | 100·0 |

Thus in the primary group, 58·1 per cent. were under 35, and 41·9 per cent. were over 35 ; in the secondary group, 30·1 were under 35 and 69·9 were over 35. It is, of course, after the age of 35 that fibroids show the greatest tendency to develop.

It will be profitable to consider more fully the

question of secondary sterility in the limited sense to which I have previously referred, namely, excluding cases where women have had more than 2 pregnancies, and also those in which less than 5 years had elapsed since the patient was pregnant.

*One-Child Sterility and Two-Children Sterility.*

I have made a careful analysis of my cases coming under this description, with the results shown in Tables XII. and XIII.

TABLE XII.—AN ANALYSIS OF CASES OF "ONE-CHILD STERILITY."

| Age at last confinement. | Under 30. | | | 30 to 34. | | | 35 & over. | | | Total. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of years sterile. | 5-9 | 10-14 | 15 and over. | 5-9 | 10-14 | 15 and over. | 5-9 | 10-14 | 15 and over. | |
| Apparently normal | 10 | 13 | 16 | 1 | 3 | 2 | — | 1 | — | 46 |
| Endometritis .. | 21 | 9 | 6 | 3 | | 1 | | | | 40 |
| Tubal inflammation | 13 | 6 | 8 | 2 | — | — | — | — | — | 29 |
| Peritonitis and adhesions .. .. | 5 | 1 | 2 | — | — | — | — | — | — | 8 |
| Retroversion .. | 11 | 7 | 4 | 2 | — | 1 | — | — | — | 25 |
| Prolapse and procidentia .. .. | 7 | 1 | 3 | 1 | 1 | 3 | — | — | — | 16 |
| Badly torn cervix .. | 6 | 5 | 2 | 1 | — | — | — | — | — | 14 |
| Ovarian tumours .. | 8 | 5 | 3 | — | — | 1 | — | — | — | 17 |
| Uterine fibroids .. | 2 | 4 | 32 | — | 4 | 3 | 1 | 2 | — | 48 |
| Uterine carcinoma .. | — | — | — | — | — | 1 | — | — | — | 1 |
| Intra-uterine adenoma | 1 | — | — | — | — | — | — | — | — | 1 |
| Premature climacteric | — | — | — | — | 1 | — | — | — | — | 1 |
| Total .. .. | 84 | 51 | 76 | 10 | 9 | 12 | 1 | 3 | — | 246 |
| | | 211 | | | 31 | | | 4 | | |

One-child sterility, or only-child sterility, on which stress was first laid by English writers, has had a greater amount of attention bestowed on it in more recent years; and it appears to me that its importance and significance have been over-estimated. Actually,

TABLE XIII.—AN ANALYSIS OF CASES OF "TWO-CHILDREN STERILITY."

| Age at last confinement. | Under 30. | | | 30 to 34. | | | 35 & over. | | | Total. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of years sterile. | 5-9 | 10-14 | 15 and over. | 5-9 | 10-14 | 15 and over. | 5-9 | 10-14 | 15 and over. | |
| Apparently normal .. | 5 | 8 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 23 |
| Endometritis .. .. | 12 | 5 | 2 | 4 | 1 | 2 | — | 1 | — | 27 |
| Tubal disease .. .. | 4 | 2 | 4 | — | 1 | 1 | — | — | — | 12 |
| Peritonitis .. .. | 3 | 2 | — | 1 | — | — | — | 2 | — | 8 |
| Retroversion .. .. | 7 | 3 | 1 | 6 | — | — | 1 | — | — | 18 |
| Prolapse and procidentia | 1 | — | 3 | 1 | 2 | 3 | — | — | — | 10 |
| Badly torn cervix .. | 2 | — | 2 | 1 | — | — | — | — | — | 5 |
| Ovarian tumours .. | 1 | 1 | 2 | 1 | — | — | — | — | — | 5 |
| Uterine fibroids .. | 1 | 2 | 18 | 1 | 4 | 3 | 6 | 1 | 1 | 37 |
| Uterine carcinoma .. | — | — | 4 | — | — | 1 | — | — | 1 | 6 |
| Badly torn perineum .. | — | 1 | — | — | — | — | — | — | — | 1 |
| Premature climacteric | — | 1 | — | — | — | — | — | — | — | 1 |
| Total .. .. .. | 36 | 25 | 38 | 16 | 9 | 11 | 8 | 6 | 4 | 153 |
| | 99 | | | 36 | | | 18 | | | |

there is no mystery about it. Just as a woman who starts life potentially fertile may acquire, before she has had a chance of conceiving, some condition which thereafter precludes the possibility of pregnancy, so also a woman may acquire or develop such a condition after she has borne one, two or more children. In the absence of such a cause for primary or secondary sterility, that is, when the pelvic organs are apparently normal, the occurrence of the primary or secondary sterility must remain unexplained, unless the condition of the husband accounts for it. Undoubtedly, and especially when a confinement has been severe and the woman has consequently been in some danger, there are cases in which husband and wife have decided not to face the risks of a second confinement, and for this and for other

reasons some preventive measures have been employed.

From Tables XII. and XIII. it will be seen that the number of cases "apparently normal" was 46 out of 246 cases of one-child sterility, or 18·7 per cent.; and 23 out of 153 cases of two-children sterility, or 15·0 per cent. The proportion in cases of primary sterility, (Table IV.) was 11·9 per cent. There is not, therefore, a great difference, and it is in the direction that one would expect, namely that among women who had shown themselves capable of pregnancy there would be a higher proportion "apparently normal" than among those who had not been able to achieve even one pregnancy. Tables XII. and XIII. show another point that one would expect, namely that among those who have had two children, the age at the last confinement ranges higher than among those who have had only one. This is seen at once on comparing the age at which the two groups ceased to bear children, as follows:

| Age of cessation of child-bearing. | One-child sterility. | Two-children sterility. |
|---|---|---|
| Under 30 .. | 211 cases or 85·8 % | 99 cases or 64·7 % |
| 30 to 34 .. .. | 31 ,, 12·6 % | 36 ,, 23·5 % |
| 35 and over .. | 4 ,, 1·6 % | 18 ,, 11·8 % |
| Total .. .. | 246 ,, 100·0 % | 153 ,, 100·0 % |

The cessation of child-bearing before the age of 30 in such a large proportion of cases—85 per cent. after 1 child and 64 per cent. after 2 children, or 77·5 per cent. for all the cases, shows that something must have happened to prevent further conception, because in normal circumstances women should be fertile for at least 10 years longer. We have now to consider the causes of this secondary sterility.

*Voluntary Abstinence or Prevention of Conception.*

This has been referred to and was probably the causal factor in a certain number of cases recorded as "apparently normal." I have, however, no data bearing on the frequency of this cause.

*Traumatism due to Labour.*

As a rule, injuries incidental to parturition do no more than induce conditions unfavourable to subsequent conception; but in some cases they are of such a kind as to produce definite sterility.

*Occlusion of the Vagina.*- This is, of course, an absolute bar to conception, unless remedied.

Craddock (1) records a case of occluded vagina after delivery, with subsequent retention of menses. The labour was instrumental: but the report does not make it clear what was the nature of the injury that led to such an unusual sequel: it was probably a badly torn vagina and perineum.

*Stenosis of the Vagina.* –Laceration of the vagina and perineum during labour may lead, as the result of cicatricial contraction, to such a marked narrowing of the vaginal orifice that, though it falls short of actual occlusion, intercourse is no longer possible. Sterility is the usual result. There are rare exceptions, of which two examples are cited on page 62, Chapter VI., as recorded by Houghton and by Carter: in both these cases a stenosis of the vagina, so marked that intercourse appeared to be impossible, resulted from injuries at the first confinement; and yet the authors were called in to attend the patients at a second confiement.

*Occlusion of the External Os.* –A remarkable case is reported by Hall Davis (2) of a complete occlusion of the os uteri with retention of the menses after a difficult labour. The patient had a thick yellow

discharge for 3 months after the confinement; and we may assume that she had a tear of the cervix which united by granulation to such an extent that the os was actually obliterated.

In such a case conception would obviously be impossible. There are, however, cases of apparent obliteration of the cervix met with during labour, in which it is evident that there must have been a channel at least large enough to admit of impregnation. In the majority of text-books on midwifery the subject is barely mentioned; but the following passage from Cazeaux's *Midwifery* (3) bears on the point:

"There can be no doubt that real obliteration of the cervix does sometimes occur.

"The best work we have on obliteration of the neck of the uterus was published by M. Depaul in 1860. In it are reported three cases of his own, in addition to those which had already been made public.

"The external orifice is the one usually obliterated, though the internal one is sometimes affected in the same way. The diseased action producing it sometimes begins after fecundation, though it seems probable that it oftener existed before it, having already considerably contracted the opening: under these circumstances, the intervention of pregnancy gave rise to conditions favourable to the completion of the closure. An attentive study of cases leads M. Depaul to the conclusion that these complete obliterations may have their origin in violence done to the neck of the uterus in the first labour, especially when it was long, painful, and required the use of instruments. All inflammations and other alterations of the cervix may be followed by obliteration: therefore it is that primiparae are not exempted, though less exposed to it than those who have borne children."

*Laceration of the Cervix.*—A moderate degree of laceration, especially when unaccompanied by any marked erosion, is relatively unimportant; but a deep bilateral tear is a serious hindrance to future pregnancies, for two reasons.

In the first place, this condition is generally associated with erosion and endometritis ; the resulting noxious discharges, as we have seen, have a destructive influence on spermatozoa and sterility results.

In the second place, if conception should occur, there is a marked predisposition to miscarriage. A number of cases of what used to be called " habitual abortion " were really cases in which a deep tear of the cervix had been overlooked and so led to abortion every time that pregnancy occurred.

The part played in the production of secondary sterility by a badly torn cervix is shown in my tables. In all the cases, Table XI., this condition was present in 31 out of 575, or 5·4 per cent. In the restricted cases shown in Tables XII. and XIII., it occurred in 19 cases out of 399, or nearly 4 per cent., its influence being shown particularly in " one-child sterility," where we find 14 cases out of 246, or 5·7 per cent.

As an instance of a favourable result following treatment I may mention the following : —

Case 88.—This was a patient aged 32, who had had 1 child, and then no pregnancy for 4 years. She had a deep bilateral tear and a retroversion ; in September, 1905, I did a trachelorrhaphy and hysteropexy. She became pregnant in January, 1907, and had a normal confinement in the following October.

The following case, by contrast, shows that a torn cervix is not an insuperable bar to conception :

Case 89.—The patient, aged 36, had 2 children, the youngest 2 years old. She had prolapse of the uterus and an old tear of the cervix, whose canal was markedly patulous. Operation was advised, but it was postponed ; and in the meantime the patient became pregnant, and she had a normal confinement 2 years later.

*Displacements of the Uterus.*—Although these occur not infrequently in women who have not been preg-

nant, they are certainly found more often in women who have had children. The stretching of the broad ligaments and of the pelvic floor, and the stretching or tearing of the perineum, incidental to pregnancy and labour, account for this greater frequency, as shown in Table XI.

Retroversion, prolapse and procidentia were present in no fewer than 110 out of 575 cases of secondary sterility, or 19 per cent. Among the restricted cases in Tables XII. and XIII. there were 69 cases out of 399, or 17·3 per cent. The cases of two-children sterility showed a slight preponderance, with 18·3 per cent., against 16·6 per cent. in the one-child sterility cases. This is what we might expect, as each succeeding confinement would tend to produce conditions of greater relaxation.

These displacements must be reckoned among the factors that are unfavourable to conception rather than among the definite causes of sterility. Obviously, the more marked the prolapse, the less is the likelihood of conception; and the cases of complete procidentia where the whole vagina is turned inside out are the most unfavourable of all.

*Inflammation of the Genital Tract.—Endometritis*, as has been pointed out, produces sterility by reason of the presence of pathological uterine discharges; and in addition to the causes that are operative in childless women, we have superadded, in cases of secondary sterility, the effects of puerperal infection. Accordingly, we find this factor present nearly half as often again in the secondary as in the primary sterility groups (Table XI.) and forming 14·7 per cent. of the former cases. In the restricted groups of Tables XII. and XIII. it forms a higher proportion still, namely, 16·8 per cent.

*Tubal disease* is one of the quite definite and incurable causes of secondary, as it is of primary sterility,

and in each group accounts for 1 case of sterility in every 10 with a slight preponderance in the secondary group. Ellice Macdonald (4) says that one-child sterility is much more often caused by gonorrhoea than is complete sterility; in my cases the difference is not so very great, as there were 11·8 per cent. of cases of tubal disease in the primary group. I need not therefore add anything more to what was said on the subject in Chapter IX.

*Peritonitis* occurs, of course, in all cases of tubal disease, but in addition, it is present in some cases where there is no history of an ascending salpingitis, and may lead to adhesions binding down the uterus in a position of retroversion, or otherwise matting up the pelvic organs. In some cases the peritonitis is of bowel origin, and may be traced to a long-standing or to an acute appendicitis, or to the perforation of a gastric ulcer. The result is inevitably sterility, which is often due to the sealing up of the tubal ostia. This factor plays a small, but none the less definite part in the production of sterility and was present in 16 cases of one-child and two-children sterility, or nearly 4 per cent.

*Ovarian tumours* occur with much the same frequency in the primary and in the secondary groups, namely 6·2 per cent. and 5·5 per cent. respectively.

*Fibroid tumours of the uterus* have already been sufficiently discussed, but I may just add that the evidence derived from the study of fibroids in relation to secondary sterility entirely bears out the conclusions at which I arrived when treating of fibroids and sterility in Chapter X., namely that fibroids develop with special frequency when long periods have elapsed without pregnancy. Thus we see in Tables XII. and XIII. that fibroids were present in 85 out of 399 cases of one-child and two-children sterility, or 21·3 per cent.; but when we consider the

cases in relation to the number of years that the patients had been sterile we find the following :

| | | | | | |
|---|---|---|---|---|---|
| 5 to 9 years, | fibroids in | 11 | cases out of | 155 | or 7·1 per cent. |
| 10 to 14 | ,, ,, | 17 | ,, | 103 | or 16·5 ,, |
| 15 or more | ,, ,, | 57 | ,, | 141 | or 40·4 ,, |

No figures could be more eloquent.

We may sum up by saying that secondary sterility is due to various causes that are also operative in producing primary sterility, whilst in addition, each group has certain causes peculiar to itself, namely with primary sterility there are causes that are congenital in character ; and in secondary sterility there are causes incidental to pregnancy and labour.

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(2) J. Hall Davis. "Complete occlusion of the os uteri after delivery with subsequent retention of the menses." London Obstet. Trans., Vol. iv., for 1862, p. 91.

(3) P. Cazeaux. A Theoretical and Practical Treatise on Midwifery. 5th American from the 7th French edition, by W. R. Bullock. Philadelphia, 1869.

(4) Ellice Macdonald. Sterility in Women. New York Med. Jour., December 23 and 30, 1911.

## CHAPTER XIII

### The Diagnosis of the Causes of Sterility

On the threshold of the consideration of the diagnosis of sterility we must bear in mind the important distinction between sterility as a pathological state, which means incapacity to conceive; and sterility as a symptom, which means merely the non-occurrence of conception in a married woman. In a monograph on Gynaecological Diagnosis (1) I expressed the matter as follows:—The distinction is important because, although a woman may be sterile in both senses—that is, actually as well as apparently—she may, on the other hand, be sterile in only one sense. Thus a single woman with an undeveloped uterus is actually sterile, but she is not apparently so; and, on the contrary, a normally endowed woman married to an impotent man is apparently, but not actually, sterile.

Women come for advice, in the first place, because they are childless, that is, apparently sterile; it is only after due investigation that we can say whether or not they are actually sterile, that is, unable to conceive.

The subject of this chapter, then, is the broader one of the diagnosis of the causes of childlessness; and the questions that we require to solve in a given case are these:—

1. Is normal intercourse possible, and has it, in fact, taken place?
2. Are the woman's pelvic organs normal?

3. If the woman appears normal, is her husband normal?
4. If the woman's pelvic organs are not normal, is the abnormality such as to cause sterility?
5. If an abnormality that causes sterility is present, is it remediable?

In dealing with diagnosis, I shall not start with the various conditions that may be found and consider the symptoms and physical signs with which they are associated; but following the plan adopted in the monograph above mentioned, I shall proceed in the inverse order and begin with symptoms, just as we should do in the presence of an actual patient who has come for advice. It will conduce to clearness to picture a series of typical cases.

FIRST QUESTION: IS INTERCOURSE NORMAL?

A. The answer is No.

Case 1.—In reply to the question, "What is wrong?" the patient states that her husband seems to have no power to effect an entrance. An examination may show an intact but otherwise normal hymen and normal pelvic organs. The patient is in her sexual prime. The next step is to interview the husband, and enquiry may show that he is unable to obtain an erection, or that the orgasm is evanescent, so that penetration cannot be effected.

*Diagnosis: Impotence of the husband.*

Case 2.—The difficulty is that there seems to be no passage. An examination is made at once, and shows that there is no vaginal orifice. On further enquiry the patient states that she has not menstruated, and has had no sensation of menstruation coming on. This is in harmony with a further point revealed by the examination, namely that there is no fulness to be felt on rectal examination, either in the vaginal region or in the abdomen.

*Diagnosis: Atresia or absence of the vagina, with underdevelopment of the uterus.*

Case 3.—Here also there is no vaginal orifice; but the patient says that she has pains every month, and a feeling of swelling in the abdomen. On examination there is a

bulging where the vaginal orifice should be, and a feeling of fulness in the vagina, as felt by the rectum.

*Diagnosis : Vaginal atresia with retained menses.*

Case 4.—Intercourse has not taken place because any attempt led to such spasms of pain that the very thought of intercourse throws the patient into a panic of fear and so the husband has desisted. On attempting an examination, the patient draws herself up and resists, and if a finger be introduced, the muscles round the vaginal orifice contract tightly, causing great pain.

*The diagnosis is vaginismus.*

Case 5.—The patient and her husband have both desired intercourse, but the passage seems too small. Examination shows the presence of a tight and rigid hymen, or an undue narrowing of the vagina, either at the entrance or deeper.

*The diagnosis is stenosis of the vagina or rigidity of the hymen.*

Case 6.—Intercourse is so painful that after the first few attempts it has not been persisted in. On asking the patient where the pain is felt, she says it is externally or near the entrance. On examination one of several conditions may be found, such as urethral caruncle, an inflamed Bartholinian gland, painful hymeneal caruncles, or an abrasion or ulceration in the region of the vaginal orifice.

*The diagnosis is dyspareunia due to painful conditions in or around the vaginal orifice.*

Case 7.—Intercourse is painful, the pain being referred to the deeper parts of the pelvis. On examination the vulva and vagina appear to be normal, but there is great tenderness in pressing on the cervix or in one or both vaginal fornices. It may be possible to define a prolapsed and tender ovary : or a painful enlargement of one or both tubes.

*The diagnosis is dyspareunia due to prolapsed ovary or to tubal discase.*

B. The answer to the first question is, Yes, intercourse is normal : and in that case we put our

Second Question : Is Menstruation Normal ?

A. The answer is, No. In reply to the enquiry, What is wrong ? we shall get several types of answer.

Case 8.- This patient states that she has never menstruated. The fact that intercourse has taken place at once differentiates this case from Cases 2 and 3, in which there is also the history of no menstruation. On examination we find that the uterus is very small; it may feel merely like a small knob surmounting the vagina. The breasts will probably be small or childish in their development.

*The diagnosis is infantile or rudimentary uterus.*

Case 9.- The patient says that menstruation is infrequent and scanty, and that it started late, perhaps at the age of 17 or 18. She has probably had periods of several months without menstruating. Examination shows that the uterus is small, the sound passing in only 2 or 2¼ inches (5 to 6 centimetres).

*Diagnosis: Under-development of the uterus.*

Case 10.—Menstruation has always been rather irregular and scanty, and has been absent altogether for some months or a year or more. The patient, who may be any age from 25 to 40, says that since menstruation ceased she has been subject to flushes of heat and to sweats. On examination the patient is seen to be stout and even obese: the vagina and uterus may be normal or rather atrophic.

*The diagnosis is premature menopause.*

Case 11.—The trouble with menstruation is that it is very painful, especially the last few years; for the first year or two after it started there was not much pain. Now the patient is often obliged to go to bed on the first day, the pain being chiefly in the lower part of the abdomen. On examination the cervix is small, with a small external os, and the uterus is acutely doubled up on itself, the finger in the anterior fornix resting in an angle formed by the cervix and body of the uterus.

*Diagnosis: Acute anteflexion of the uterus: probably there is in addition stenosis of the cervical canal.*

Case 12.—Menstruation is excessive and prolonged; this has been getting gradually worse, so that sometimes the patient is not clear from one period to another. She may add that intercourse is usually followed by some bleeding. On examination the cervical canal is rather patulous; the finger in the canal may encounter a smooth projection. Or there may be a mucous or fibroid polypus projecting from the external os, and perhaps lying in the vagina, with a long pedicle passing up into the cervical canal.

*The diagnosis is uterine polypus.*

Case 13.—Menstruation is excessive, but, unlike the previous case, the flow is confined to the menstrual period, which is, however, prolonged. The patient is probably over 30 and may be nearer 40, and may have been married 10 years. Examination shows that the uterus is either uniformly or irregularly enlarged and hard : it may form a tumour rising into the abdomen.

*Diagnosis : Uterine fibroids.*

2. The answer to our second question is that menstruation is normal ; that is, that it is regular or fairly so ; is moderate in quantity, and not attended by any unusual amount of pain. This leads to our

THIRD QUESTION : ARE YOU TROUBLED WITH DISCHARGE, OR "WHITES" BETWEEN THE PERIODS ?

A. The answer is Yes. We shall get various particulars in different cases.

Case 14.—The discharge is whitish, sometimes like white of egg, sometimes rather creamy and staining the linen. There is no particular pain, but sometimes a feeling of lassitude. On examination the uterus is bulky ; when the cervix is exposed by means of a speculum, some muco-pus can be seen coming from the external os.

*The diagnosis is endometritis.*

Case 15.—The discharge is thick and yellow : otherwise the symptoms are as in the last case. The uterus is felt to be bulky, and the speculum examination shows that the cervix has a raw red appearance, and is covered with a rather tenacious muco-pus.

*Diagnosis : Endometritis with erosion of the cervix.*

Case 16.—The discharge is yellow and free ; it has been going on for a few days or a few weeks. The passage feels hot and painful, and there is a burning sensation on passing water. On examination, the vulva is reddened ; the urethral orifice is also reddened and on pressing outwards along the urethra a drop of pus is seen. On introducing a speculum, the vagina is very red, and bathed in pus. When the discharge is removed with a swab, the redness of the vagina

and of the vaginal portion of the cervix has a punctiform character.

*Diagnosis: Acute vaginitis, probably gonorrhoeal in origin. This origin may be confirmed by taking a swab for bacteriological examination.*

Case 17.—The discharge is yellowish white; some time previously it was thick yellow, and the patient remembers that it came on rather suddenly, perhaps soon after marriage: and that at first it was associated with scalding pain on passing water. There is a good deal of pain in the lower abdomen; intercourse has become painful, the pain being deep-seated. She may state that menstruation has been rather increased in quantity. On examination the uterus feels rather fixed, and on one or both sides a tender swelling is felt in the position of the appendages.

*The diagnosis is inflammatory disease of the tubes. According to the acuteness or otherwise of the symptoms, a further diagnosis may be made of pyosalpinx or of chronic tubo-ovarian inflammatory disease.*

B. The answer to the third question is, No, there is no undue amount of discharge; and we proceed with the

FOURTH QUESTION: DO YOU HAVE ANY PAIN BETWEEN PERIODS?

i. The answer is Yes. Again, on enquiring into the character of the pain we shall meet with several types of reply.

Case 18.—One patient will say that the pain is principally in the back, with some feeling of weight in the lower abdomen. There may be a little increase in the flow at the periods, and a little leucorrhoea, though neither is of sufficient importance to have had stress laid on it, in reply to the second and third questions. On examination the fundus is felt distinctly behind the cervix; and on passing the sound, the fact is confirmed that the swelling felt behind the cervix is really the fundus.

*The diagnosis is retroversion of the uterus.*

Case 19.—Another patient says that the pain is of the character of a general aching and sense of fulness in the pelvis; there is frequent desire for micturition and some

difficulty with the bowels. Examination shows that the cervix is pressed forwards against the pubes, and the hollow of the sacrum is filled up by a firm tumour, which seems to be rather wedged in the pelvis. Menstruation is unaltered in quantity, but may have become rather more painful.

*The diagnosis is a semi-solid ovarian tumour or a sub-peritoneal fibroid impacted in the pelvis.*

Case 20.—In this case the pain is referred to the iliac region of one or both sides. The patient is generally out of health, easily tired, and though seldom feeling really ill, she never feels really well. On examination the uterus feels rather fixed: there is a feeling of increased resistance in the region of the appendages, though perhaps there is no very definite swelling. We may elicit a history of recurrent attacks of pain in the right side.

*The diagnosis is chronic pelvic peritonitis with adhesions and matting of the appendages. It may have originated in a chronic appendicitis, or be tubal in origin.*

ii. The answer to the fourth question is, No, there is no special pain. In fact, the patient may feel nothing wrong with her; and on this account she cannot understand why she has not become pregnant, and she wants to know whether there is any explanation.

Case 21.—We proceed to examine such a patient, who may be a young and apparently healthy and vigorous woman. The pelvic organs all appear to be quite normal.

*The diagnosis is functional sterility due to some unknown cause. Probably the fault lies with the husband.*

The only way to clear up the latter supposition satisfactorily is to make a test as to the presence and vitality of the spermatozoa, as detailed in Chapter I.

Other cases. It must be borne in mind that there are a certain number of pathological gynaecological conditions that present none of the four leading symptoms that we have been discussing; that is to say, that intercourse may be apparently normal and there is neither menstrual disturbance, nor discharge,

nor any special pain. Among such conditions we may mention certain ovarian tumours, some cases of interstitial and subperitoneal fibroids, tuberculous pyosalpinx, some cases of anteflexion and of retroversion, and some forms of malformation, such as congenital atresia of the tubes, and minor degrees of under-development.

I have sketched out a certain number of types of cases that are met with in patients who come complaining of sterility; but there are, of course, many cases that do not conform exactly to any one of these types. A careful investigation of symptoms followed by a methodical and thorough examination will, however, leave very few cases in which a reasonably accurate diagnosis cannot be arrived at. In cases of doubt, an examination under anaesthesia will usually clear up all difficulties.

Finally, there are some cases in which we must conclude that the cause of the sterility is deficient ovarian activity, due to constitutional conditions, such as anaemia, faulty metabolism and obesity; toxic agencies such as febrile diseases or drugs like alcohol and morphia; abnormalities of the internal secretions, including those of the thyroid and of the ovary itself; premature cessation of ovarian activity, in which category we shall have to include women who have married too late in life; and, lastly, those little-understood conditions that result from sexual excess and sex-incompatibility.

By way of summary of the observations contained in this chapter, the diagnosis of the causes of sterility, and of the conditions associated with it, may be set out in tabular form.

First Question: Is Intercourse normal?

A. No. May be due to—

1. Impotence of the husband.
2. Atresia or absence of the vagina.

3. Vaginal atresia with retained menses.
4. Vaginismus.
5. Stenosis of vagina or rigidity of the hymen.
6. Dyspareunia from lesions of the vaginal orifice.
7. Dyspareunia due to pelvic disease.

B. Yes. 2nd question: Is menstruation normal?

1. No. May be due to—
   8. Infantile or rudimentary uterus.
   9. Under-development of the uterus.
   10. Premature menopause.
   11. Acute anteflexion, with stenosis.
   12. Uterine polypus.
   13. Uterine fibroids.
2. Yes. 3rd question: Is there any unhealthy discharge?
   (*a*) Yes. May be due to—
      14. Endometritis.
      15. Endometritis with erosion.
      16. Vaginitis, especially gonorrhoeal.
      17. Inflammatory tubal disease.
   (*b*) No. 4th question: Is there pain between the periods?
      *i.* Yes. May be due to—
         18. Retroversion of the uterus.
         19. Ovarian or uterine tumour in the pelvis.
         20. Chronic pelvis peritonitis with adhesions.
      *ii.* No. We may find—
         21. Patient normal: husband at fault.

Other cases: Various pelvic abnormalities, deficient ovarian activity, etc.

I have not, of course, attempted to cover the whole ground of gynaecological diagnosis; and particularly I have omitted the consideration of such conditions as have no bearing on sterility.

REFERENCE

(1) Giles, A. E. Gynaecological Diagnosis. London, 1906; chapter xiv., "Leading Symptom, Sterility."

## CHAPTER XIV

### Prognosis in Cases of Sterility

When a woman seeks for advice on account of sterility, the first thing is to find out the condition of the pelvic organs, as indicated in the preceding chapter. The next important matter is to be able to tell her whether the conditions present are the cause of her sterility and whether they are curable. The present chapter is concerned with the answers to these questions.

It is, of course, a great disappointment to a woman, whose chief desire in life is to have a child, to be told that this is not possible. But in most cases it is better, if this is the case, that she should know it and face her disappointment once for all, than that she should continue, year after year, to hope for the unattainable, and experience every month a fresh disappointment. As the time for each monthly period approaches, her hopes rise high; then the flow appears, and her hopes are once more dashed to the ground. Whereas, if she can once realise that it is not to be, although regret may endure, it will become softened with time, and it will be robbed of the poignancy of repeated disappointment.

Another point is to be borne in mind, when giving a prognosis as to the results of treatment. It is this, that whilst we may be able to rectify that which is evidently faulty, and to restore the pelvic organs to such a condition that there is no obvious obstacle to conception we can in no way guarantee that pregnancy

will follow. We must therefore make it quite clear that while treatment will improve the chances of pregnancy we can in no case promise a favourable result.

We may divide all the cases into three groups :

1. Those in which sterility is inevitable and irremediable.
2. Those in which sterility is inevitable without treatment but not irremediable.
3. Those in which sterility is probable without treatment.

Let us consider each of these groups in turn.

1. *Cases in which Sterility is inevitable and irremediable.*

We shall find it easy to recognize those cases in which sterility is inevitable and irremediable if we recall the conditions necessary for successful impregnation. These are :

A. The ability on the man's part to deposit healthy spermatozoa in contact with the woman's cervix.
B. On the woman's part :—
   i. The production of healthy ova.
   ii. The ability to receive the seminal fluid in contact with the cervix.
   iii. Such a healthy condition of uterus tubes and ovaries as will enable the spermatozoa to travel up to meet the ovum.
   iv. Such a healthy condition of the uterus as will enable it to harbour the fertilised ovum.

A. *On the man's part.* The condition of *azoöspermia*, in which no spermatozoa are present in the semen, leads inevitably to sterility. In nearly all cases this is also irremediable. The one possible exception will be considered in speaking of the second group of cases.

B. *On the woman's part.*

i. If healthy ova cannot be produced, sterility is inevitable. The cases that answer to this description are :—

*Under-development of the ovaries.*

*Bilateral ovarian tumours*, where all the normal ovarian tissue has been destroyed.

Ovaries whose function has been permanently destroyed by *toxic agencies, such as drugs*, or by *mechanical agencies such as the X-rays.*

*Ovaries that have ceased to function* owing to age-changes, whether these occur at the normal climacteric period or prematurely.

ii. Under the heading of inability to receive the seminal fluid we find *absence of the vagina.* Atresia and stenosis of the vagina come into the next group.

iii. The conditions that prevent the ascent of spermatozoa to meet the ovum are :—

*Absence of the uterus.*

*Rudimentary uterus.*

*Tumours blocking up the cervix and irremovable except by hysterectomy.*

*Occlusion of the tubes* by *congenital atresia* or by *salpingitis and pyosalpinx.*

iv. The uterus cannot harbour the fertilised ovum if it presents one of the following conditions :—

*Infantile uterus.*

*Under-development of the uterus.*

*Uterine fibrosis.*

*Uterine tuberculosis.*

*Carcinoma of the body of the uterus.*

2. *Cases in which Sterility is inevitable without Treatment, but not irremediable.*

We can review the conditions that come under this description under the same headings as we adopted in the first group.

*A. On the Man's Part.*

There are two deficiences on the man's part that lead to sterility unless remedied.

The first is *impotence.* If the male organ cannot be introduced fertilization cannot, generally speaking, take place. The rare and curious cases referred to in Chapter VI., of impregnation in spite of stenosis of the vagina or rigid hymen or non-penetration do

not invalidate the truth of the general proposition; and the man who would give a favourable prognosis in the presence of male impotence would be an incorrigible optimist. But there are methods of treatment, as we shall see in the next chapter, which make conception possible.

The second condition is *azoöspermia*, to which a reference was made in speaking of the first group of cases. Without treatment sterility is inevitable, but the operation of epididymo-vasostomy offers a ray of hope. In both these conditions the prognosis, though not hopeless, is still far from good.

*B. On the Woman's Part.*

i. Sterility due to the non-production of healthy ova is permanent: there are no cases that are remediable.

ii. Inability to have intercourse. Here we have several conditions that are susceptible of treatment.

*Stenosis of the vagina and rigidity of the hymen.*—In these cases treatment is easy, and provided no other abnormal conditions are present, prognosis is very good.

*Atresia of the vagina.*—Here, also, treatment is easy; but the prognosis after treatment will depend in some measure on whether the case is of old standing. In a young woman, when the retention of the menses has not led to marked changes in the uterus and tubes, conception may follow the division of the occluding membrane. In an old-standing case I should say that whilst conception may not be impossible, it is nevertheless improbable.

*Prolapse and procidentia* occur in nulliparae, though not commonly. Procidentia precludes the possibility of intercourse, and a considerable degree of prolapse will have the same effect. These conditions are

eminently amenable to treatment, and thereafter the prognosis is decidedly good.

*Pelvic tumours* encroaching on the vagina may obstruct intercourse more or less completely; as a rule, tumours are removable, and the prognosis, as regards the occurrence of intercourse, is good: but the prognosis as regards sterility will depend on the nature of the tumour. A one-sided ovarian tumour or a pedunculated fibroid susceptible of myomectomy will enable us to give a favourable prognosis; bilateral ovarian tumours and fibroids necessitating hysterectomy necessarily make the prognosis hopeless.

iii. Among the conditions that offer an obstacle to the ascent of spermatozoa are the following:—

*Acute vaginitis and endometritis.*—In these cases the pathological secretions are so fatal to the vitality of the spermatozoa that they may be said to form an impenetrable barrage; and so long as these discharges exist sterility must occur. But appropriate treatment may restore the normal function, and we may say that with such treatment the prognosis is good.

*Pelvic inflammation with adhesions and salpingitis* in which the process has been sufficiently mild for the tubal ostia to escape occlusion, can be treated in such a way that the inflammatory reaction may subside; it is possible that in some of these cases pregnancy might follow treatment, but I should always give an unfavourable prognosis, and say that though pregnancy is not impossible, it is improbable. For in such cases the degree of restoration of the tubal function is very much a matter of conjecture; and, in the absence of operation (and the essence of the treatment is non-operative), it is impossible to be sure whether the tubal ostia are occluded or not.

*Occlusion of the tubes.*—It is obvious that as long as

the tubes are occluded in any part of their course, sterility must result. If the lining of the tubes were healthy, restoration of the patency of the tubes might raise the blockade and allow of conception. The operation of salpingostomy has been done in a good many cases, to open up the occluded fimbriated end of the tube. Some good results have been reported, but as a rule the process that seals the ostium destroys the mucosa, in such wise that the tubal channel may be restored without restoring the function of the tube.

I should say, therefore, that even after treatment the prognosis in the matter of sterility is by no means hopeful.

iv. Of the conditions of the uterus that disable it from harbouring the fertilized ovum the incurable ones have been mentioned; there are others that are curable.

*Endometritis.*—In most cases endometritis has the effect of preventing conception by reason of the lethal effect of the secretions on the spermatozoa; but in mild cases the spermatozoa may survive and effect an union with an ovum, yet the endometrium is too unhealthy to afford an attachment to the oösperm. In such a case treatment of the endometrium may overcome the difficulty and a successful pregnancy may be the result. The prognosis in cases of this kind is good.

*Uterine polypus.*—A polypus within the uterine cavity produces an unhealthy condition of the endometrium and also exerts a disturbing influence on the whole uterus, which is provoked to unwonted contraction in order to expel the "foreign body." In both these ways a polypus militates against the successful "nidation of the ovum." Removal of the polypus renders the prognosis for pregnancy a good one.

3. *Cases in which Sterility is probable without Treatment but not inevitable.*

*A. On the man's part* we may include in this category mild degrees of impotence; by which I mean that the impotence, though usual or habitual, is not invariable, and an erection can sometimes be obtained sufficient to allow of penetration.

The prognosis is not very good, but it is by no means hopeless.

*B. On the Woman's Part.*

i. When the production of healthy ova is hindered by conditions of faulty metabolism, an improvement may occur spontaneously, and healthy ovulation take place.

*Obesity* may be mentioned as a case in point. The prognosis, however, remains not very good.

ii. There are several conditions that offer an obstacle to the healthy contact of spermatozoa with the external orifice of the cervix. They are

*Stenosis of the vagina and rigidity of the hymen.*—The difficulty may be overcome by patience and endurance on the part of husband and wife; and the prognosis may be said to be fairly good.

*Vaginismus and dyspareunia.*—The same remarks apply to these conditions; but from the nature of things vaginismus is overcome spontaneously less easily than dyspareunia. If a woman has pain on intercourse, but is desirous of it, she may screw up her courage to endure the pain; but when her nervous system is so constituted that the mere thought of the act raises the standard of revolt in all her muscles, she has seldom the self-control necessary to put down the rebellion. I should therefore describe the prognosis as good in the case of dyspareunia and bad in the case of vaginismus.

*Acute anteflexion of the uterus.*—While this condi-

tion is undoubtedly unfavourable to conception, it may nevertheless occur. The prognosis is not good.

*Anteflexion of the uterus with stenosis of the os externum.*—The element of stenosis aggravates the prognosis in the case of anteflexion, and when the stenosis is extreme, as in the condition described as a "pinhole os," the prognosis is definitely bad.

*Retroversion of the uterus.* Retroversion is unfavourable to conception, though probably not to the same degree as anteflexion. The prognosis is therefore not very good.

*Prolapse of the uterus* affects the prognosis according to its degree; with a slight prolapse the prognosis is good, but when it is considerable, the cervix coming down to the vaginal orifice, an unfavourable prognosis must be given.

iii. Under the heading of cases where sterility is probable without treatment, on account of obstacles to the normal ascent of the spermatozoa, but where it is not inevitable, we may include:

*The lesser degrees of endometritis;* the prognosis is fairly good.

*Mild degrees of salpingitis.*—There is no doubt that pregnancy does sometimes occur in spite of some affection of the tube; but it must be borne in mind that in such cases there is quite a definite predisposition to the arrest of the fertilized ovum in the tube, leading to the development of an extra-uterine pregnancy. The prognosis in any case is bad.

iv. The only condition that comes under this heading is *mild endometritis.* The prognosis is fairly good.

In practically all the cases in Group 3, where in the absence of treatment sterility is probable but not inevitable, suitable treatment materially alters the prognosis, and as the result of such treatment a quite favourable prognosis may be given.

By the way of summarizing these observations, the prognosis of the varied conditions associated with sterility may be given in tabular form. (Table XIV.)

TABLE XIV. SHOWING THE PROGNOSIS OF STERILITY IN CASES UNTREATED AND AFTER TREATMENT.

| Conditions associated with sterility. | Irremediable. | Remediable. | |
|---|---|---|---|
| | | Before treatment. | After treatment. |
| A. Affecting the man— | | | |
| Azoöspermia .. .. | | Hopeless. | Bad. |
| Impotence .. .. | | Bad. | Moderate. |
| B. Affecting the woman— | | | |
| i. Defective ovulation— | | | |
| Under-development of ovaries .. .. | Hopeless. | | |
| Bilateral ovarian tumours .. .. | Hopeless. | | |
| Suppression of ovulation by age, drugs or X-Rays .. .. | Hopeless. | | |
| Faulty metabolism (obesity) .. .. | | Bad. | Moderate. |
| ii. Interfering with intercourse— | | | |
| Absence of the vagina | Hopeless. | | |
| Atresia of the vagina .. | | Hopeless. | Bad. |
| Stenosis of the vagina | | Bad. | Good. |
| Rigidity of the hymen | | Bad. | Good. |
| Dyspareunia .. .. | | Moderate. | Good. |
| Vaginismus .. .. | | Bad. | Good. |
| Tumours encroaching on vagina .. .. | Some hopeless. | Hopeless. | Good. |
| Procidentia .. .. | | Hopeless. | Good. |
| Prolapse .. .. | | Bad. | Good. |
| iii. Interfering with ascent of spermatozoa— | | | |
| Absence of the uterus | Hopeless. | | |
| Rudimentary uterus | Hopeless. | | |
| Anteflexion of the uterus | | Moderate. | Good. |
| Stenosis of the os externum .. .. | | Bad. | Good. |

| Conditions associated with sterility. | Irremediable. | Remediable. | |
|---|---|---|---|
| | | Before treatment. | After treatment. |
| Tumour blocking the cervix .. .. | Some hopeless. | Hopeless. | Moderate. |
| Atresia of the os externum .. .. | | Hopeless. | Moderate. |
| Congenital atresia of the tubes .. .. | | Hopeless. | Bad. |
| Mild salpingitis .. | | Bad. | Bad. |
| Pyosalpinx .. .. | Hopeless. | | |
| Acute vaginitis and endometritis .. | | Hopeless. | Moderate. |
| Chronic endometritis | | Bad. | Good. |
| Uterine polypus .. | | Bad. | Good. |
| Retroversion .. .. | | Bad. | Good. |
| iv. Interfering with development of the fertilised ovum— .. | | | |
| Infantile uterus .. | Hopeless. | | |
| Under-development of the uterus .. .. | Bad. | | |
| Uterine fibrosis .. | Hopeless. | | |
| Uterine tuberculosis .. | Hopeless. | | |
| Carcinoma of the body of the uterus .. | Hopeless. | | |
| Chronic endometritis | | Bad. | Good. |

## CHAPTER XV

### Treatment

The practitioners of the science and art of medicine have ever felt that the successes obtained in the treatment of disease, great as they have been, have been of a lower order than the triumphs achieved in its prevention. It was a great thing to cure cases of smallpox, and to save from death patients attacked by blood-poisoning after operations. But how much greater have been the stamping out of small-pox, and the prevention of sepsis in surgery!

To cure sterility is to confer great blessings on the community: but what a priceless boon it would be if sterility could be prevented in the vast majority of cases!

There must always be some diseases and some malformations, and even some constitutional conditions that will result in childless marriages. Nevertheless much could be done to prevent the unhappiness and the opprobrium of the barren woman. I will venture to make some suggestions on what we may call

### The Preventive Treatment of Sterility.

It appears to me that in our efforts in the direction of the prevention of sterility we must seek to promote the following aims.

1. *Education and Hygiene of the Young.*—Boys and girls who have attained the age of puberty should be taught in a simple and clean-minded fashion the

nature of the function of reproduction. It should be held up before them as something to be regarded with respect and even with reverence. The pure-minded girl is taught by her instinct and by tradition that chastity is her most precious possession, and that death is preferable to dishonour. With boys this idea is not strongly inculcated by instinct, nor is it supported by tradition: but is there any reason why this instinct should not be fostered, and the foundations of this tradition laid? I am not so utopian as to believe, or so visionary as to suggest, that the practices and ideas of thousands of years can readily be changed; but public opinion can be moulded and evolved by persistent effort, and it is, next to religion, the most powerful extrinsic regulator of conduct. Let it then be taught persistently that sexual restraint is to be considered as indispensable as honesty, courage, and fair dealing, and that licentiousness is to be classed and loathed with all mean and despicable vices.

Young people should be told something of those scourges of civilization, syphilis and gonorrhoea; the far-reaching effects of these diseases should be explained. In so far as the knowledge of these things has a deterrent value, it is perfectly legitimate to make the most of it.

Many men, both young men and older ones, have a salutary dread of syphilis; but they are apt to regard gonorrhoea, or as it is vulgarly known, "clap," as a minor matter. They should be taught that gonorrhoea is at least as important as syphilis: I should say that from the point of view of marriage it is more important, because it is more insidious and can do a greater amount of irreparable damage. Salvarsan and 606 can cure most cases of syphilis, but a young woman whose tubes have become infected by gonorrhoea is, from the point of view of

motherhood, damaged beyond repair. The young man who is "sowing his wild oats" likes to think that later on he will settle down and marry a nice girl, and have children about him. Would he pause in his sowing if he were made to realize that the harvest that he must expect is an invalid wife and a childless home?

I do not believe that in the past parents and teachers have done all that is possible for them to do. This is surely their province. But if it be not so, perchance some medical writer with the necessary vision and with the welfare of the race at heart may draw up two simple and suitable leaflets on "What a boy should know" and "What a girl should know," and let these be distributed widely throughout the land.

2. *Early Marriages.* For the sake of the race these should be encouraged, for several reasons. In the first place, early and suitable marriage minimizes the danger of illicit and promiscuous sexual intercourse with all its attendant medical evils. In the second place, it is obvious that in young men and women sexual vigour is at its best and there is then the greatest likelihood of conception and of the begetting of healthy children. In the third place, even with men and women who have led continent lives, the expectation of fertility is greatest, as Matthews Duncan has shown, in women who marry between the ages of 20 and 25: after the age of 25 there is at first a steady and then a rapid decline in the likelihood of fertility. This question has been discussed in Chapter VIII. We need not dwell on other manifest advantages of early marriage, such as that which results when parents have children while they are themselves still young and consequently able to enter into the lives of their children, and to be their companions as well as their guardians.

3. *Early Investigation when Marriages are fruitless.* – Matthews Duncan has shown that on an average the first child is born about 16 months after marriage. Consequently, when the first year has passed without any sign of pregnancy, an examination should be made to ascertain whether there is any cause. Frequently such a cause is one that is simple and easily remedied; and when this is done early, a favourable result may be expected. But if many years are allowed to pass without investigation, then, although the cause may still be remediable, the age-factor has crept in, and the chances of pregnancy are materially diminished. Clearly, the older a woman is when she marries, the sooner should doubts as to her ability to conceive be cleared up, lest precious time be lost.

4. *Early Treatment of faulty Conditions.* –This is a corollary to the preceding paragraph. When faulty conditions are present, it is useless to mark time. If there is difficulty in intercourse, it should be remedied at the beginning: such conditions as anteflexion, stenosis, and displacements are just as well remedied early as late. Inflammatory conditions, when treated early, frequently yield readily, whereas delay may spell disaster. Briefly, in considering the begetting of children, we may learn from the husbandman. Winter is not the time for harvest.

We may now pass on to the consideration of the treatment to be adopted in cases of sterility.

## The Treatment of Sterility.

In the forefront of the question of the treatment of sterility I would lay stress on the principle laid down in the last paragraph of Chapter I., namely: Inasmuch as the husband is at fault in a considerable proportion of childless marriages (varying between

10 and 50 per cent.) in doubtful cases the wife should not be assumed to be responsible and submitted to operative procedures without obtaining definite evidence that the husband is healthy. I may recall that in 12 per cent. of all my cases of sterility the pelvic organs showed no abnormality; and among the pathological conditions found in the remainder were to be found abnormalities that had no direct causal relation to the sterility.

Such procedures as dilatation of the cervical canal and curetting have sometimes been carried out in the hope that pregnancy would follow when more careful investigation would have established the fact that the husband was impotent, or that the seminal fluid contained no spermatozoa. Under such conditions, any operation on the woman is unfair to her, and does harm both by raising hopes that are doomed to disappointment and by discrediting the value of treatment in suitable cases. Hence we should make this an absolute and invariable rule of practice:—*when we are consulted for sterility by a woman whose pelvic organs show no condition that can be considered as an obvious and definite cause for the sterility, the husband should be examined.*

The methods of such examination have been sufficiently explained in Chapter I.

We may now pass in review the causes of sterility and discuss their treatment; referring in passing to certain conditions in the male.

*Azoöspermia.*—Whilst in many cases this condition does not admit of treatment, there are some where it may be tried. The first step, having ascertained that there are no spermatozoa in the seminal fluid, is to make an aspiration of the testicle, by means of a fine trocar. If live spermatozoa are found by this process, the operation of epididymo-vasostomy may be performed. I would refer the reader who desires

further information about the operation and its technique to Martin's paper (1).

*Impotence of the Male.*—There are many cases in which the man's seminal fluid contains healthy spermatozoa, but the trouble is that he cannot eject it into the vagina. There are two ways in which the difficulty can be met; and although no guarantee of success should be given, one or both plans may be tried.

The first is the use by the man of a vulcanite sheath, something like a vaginal speculum (Fig. 10); the end that is bevelled in the speculum is rounded, and has a small terminal opening. The flanged end has

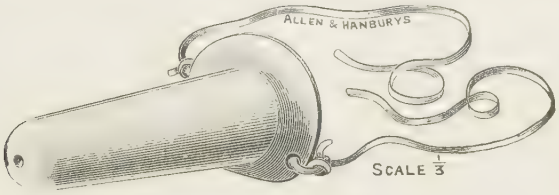


FIG. 10.—Penile Sheath.

two holes through which tapes are passed and tied; the sheath is placed over the penis, and the tapes are tied around the hips. By this means an artificially rigid penis is obtained, that will at least carry the seminal fluid into the vaginal fornix.

The other method is that of *artificial insemination.* In order to carry this out the husband is directed to bring a condom specimen of the semen, obtained as recently as possible, and kept warm, for example in a thermos flask. The wife comes to the consulting room at the same time. She is placed in the gynaecological position, a sterilized Fergusson's speculum is introduced into the vagina and the cervix is swabbed over with some normal saline or weak bicarbonate of soda solution. A special syringe is at hand fitted with a nozzle something like a narrow hollow uterine

sound (Fig. 11). The syringe having been sterilized, and lying in a normal saline or weak alkaline solution, the condom is opened and its contents drawn up into the syringe; the nozzle is passed up into the uterine cavity and the seminal fluid injected therein.

Some attention must be paid to the time when this procedure is carried out, in relation to the menstrual period; and this raises the question—*What is the most favourable time for conception?*

It is generally considered that the best time is within a few days of the cessation of menstruation; that the next best time is a few days before a period is due; and that the least favourable time is in the

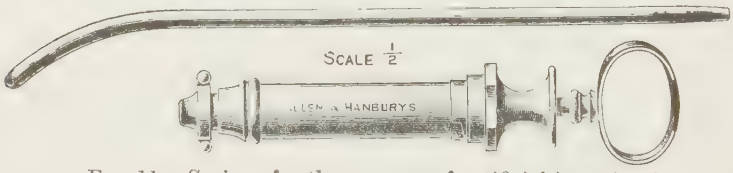


FIG. 11.—Syringe for the purpose of artificial insemination.

middle of the intermenstrual period. Kisch (2) quotes a number of ancient and modern writers. Thus, in the writings of the ancient Indian physician Susruta, is the phrase, "The time of the union is the twelfth night after the appearance of the menses." The practice of orthodox Jewish women corresponds with this; for it is laid down in the *Talmud* that coitus may not take place during menstruation nor for seven days afterwards; and this would bring the time to about the twelfth day from the onset. It is well known that Jewish women show a high standard of fertility. In Japan the medical opinion is that women conceive most readily during the first ten days after menstruation, and that for the remainder of the intermenstrual period they do not conceive. The statistical data of Löwenhardt, Ahlfeld, Hecker, Veit, and others go to show that the

chances of conception are greatest in the early days after menstruation, and that thereafter the chances become progressively less until the next period. Hensen (3), basing his observations on 248 cases in which the date of coitus was known, comes to the following conclusions :—

1. The greatest number of conceptions follow coitus taking place in the first days after the cessation of menstruation.

2. The chances of conception during menstruation increase, the nearer the end of the menstrual period approaches.

3. The number of conceptions following coitus just before menstruation is minimal.

4. There is no time during the menstrual and intermenstrual periods when conception cannot occur.

It is probably a safe conclusion that the most favourable time for conception is a few days after the cessation of menstruation.

If artificial insemination is to be carried out, this time should be chosen ; and this time may be recommended to patients who ask our advice on the subject.

We can now pass on to the consideration of the treatment to be adopted in those conditions of the female pelvic organs which either preclude conception or are unfavourable thereto.

### Functional Disorders.

*Dyspareunia.*—The first thing is to make a careful investigation in order to ascertain whether there is any *sore place*, *cut*, or *abrasion* in the region of the vaginal orifice : any such must be treated by suitable means. Sometimes there is a crack in the mucosa, which becomes opened up afresh with each attempt at intercourse, and then the best plan is to dilate the orifice well with the fingers under anaesthesia, and let the sore places granulate up.

*A urethral caruncle* may be a source of pain, and this can be cauterized with the electric or thermocautery or it can be dissected out.

*Painful hymeneal caruncles* will show up as reddish nodules; the best thing to do with them is to excise them.

*An inflamed Bartholinian cyst* should be dissected out; and the incision should be made as far out as possible, otherwise the cicatrix itself may be painful and become a source of dyspareunia.

The above are the principal causes of pain referred to the vaginal orifice. There are others more deep-seated.

*A prolapsed ovary* may cause acute pain on intercourse. When it is associated with backward displacement of the uterus, the rectification of the position of the uterus will usually raise the ovary out of harm's way. But in some cases the ovary remains prolapsed, or it may be in this position when there is no uterine displacement. Sometimes it can be pushed up sufficiently to relieve symptoms; if not, an abdominal operation may be undertaken. If then the ovary is found grossly diseased it should be removed; if not, it can be stitched up by a shortening of the ovarian ligament, and if it be partly cystic, the cystic portion can be resected.

*Inflamed tubes* are a source of dyspareunia, and their treatment will be considered under their appropriate heading.

Sometimes, on making pressure on the cervix, the patient will complain of pain and say that it is like the pain that she has on intercourse. It will generally be found that the pain is a transmitted one, due to the fact that pressure on the cervix causes pressure on ovaries or inflamed tubes. This is also the common explanation of dyspareunia associated with retroversion of the uterus.

*Vaginismus.*—The treatment of this troublesome affection is partly physical and partly psychical. On the physical side the vaginal orifice should be well stretched under anaesthesia. On the psychical side it should be explained to the patient that if she can brace herself up to submit to intercourse on a few occasions the difficulty will automatically disappear.

The observations of Ellice Macdonald on the subject of vaginismus (see page 44) are specially valuable as emanating from a medical woman. In speaking of treatment she says: (4) "Treatment must consist in convincing the patient that her genital organs are entirely normal and that her fear of pain is unfounded. She should be directed to contract the antagonistic muscles; these are the abdominal muscles and those used in straining downwards at stool. If the antagonistic muscles are contracted, it will tend to relax the muscles contracted in vaginismus."

### Malformations of the Pelvic Organs.

For some of these there is nothing to be done; namely extreme under-development of the uterus and ovaries, and absence of the vagina. Various attempts have been made to establish an artificial vagina, but such attempts end in failure.

*Atresia of the vagina* should be treated by excision of the whole or greater part of the occluding membrane under the strictest aseptic conditions. Mere puncture or incision is not good because of the tendency of the orifice to close again.

*Rigidity of the hymen* and the lesser degrees of *narrowing of the vaginal orifice* can usually be dealt with sufficiently by dilatation with the fingers or with graduated specula, under anaesthesia. Glass vaginal dilators have been devised to be introduced by the patient from time to time to keep the orifice

stretched; but they are seldom required in these conditions.

*Cicatricial contraction of the vagina*, whether at the orifice or in the deeper part of the vagina, does not yield to a simple stretching. A plastic operation is required, as follows:—A vertical incision is made in the posterior vaginal wall through the narrow part; the middle of each side of the incision is seized with a forceps and drawn outwards, till the wound becomes lozenge-shaped; and a continuous suture of catgut is then carried across from one side to the other, so that the resulting seam is transverse. The longer the incision the greater is the widening effect produced. Here again the subsequent use of vaginal dilators is seldom necessary.

One of the forms of contraction of the vagina is an annular constriction just below the cervix, producing an hour-glass form of vagina. Here the constriction must be dealt with on the same principle, namely, a vertical incision on the posterior aspect, stretching of the contracted ring, and suture of the wound so as to produce a transverse seam.

*Simple under-development of the uterus.*—For this condition no treatment is possible. Any hopes of causing such a uterus to develop by electrical or other stimulation are fallacious. Certainly if the natural stimulus of married life has no effect, nothing else will. But, as mentioned in a previous chapter, some cases of under-development are really cases of delayed development, and good results may often be hoped for from the *vis medicatrix naturae*.

*Acute anteflexion of the uterus and stenosis of the cervical canal.*—These can be taken together, because in the main the same treatment applies to both. Under anaesthesia the cervical canal should be dilated by means of graduated metal dilators, to the extent of slightly splitting the mucous membrane of

the internal os. When the smaller dilators are being passed very great care must be exercised lest the uterus be perforated: the sharp flexion makes this accident more liable to occur than would be the case with a normally shaped uterus. Sometimes also the cervical canal is so rigid that even small dilators cannot be passed except by the exercise of such force as will probably cause the volsella to be torn from its grip of the anterior lip of the cervix. In such cases it is a good thing to desist, and to introduce into the cervical canal a small laminaria tent, which is left in position until the following day, when it will probably be found that the dilatation can be effected with ease. When dilatation is complete, a glass intra-uterine stem should be introduced, and allowed to remain during the time that the patient is in bed, that is, for 10 to 14 days. It should be removed before the patient gets up.

Sometimes a simple dilatation of the cervical canal is done, but the effects are liable to be less permanent as regards relieving dysmenorrhoea, and less successful from the point of view of the sterility.

Townsend (5) lays stress on the view that dilatation does not yield the best results unless it is accompanied by the introduction of an intra-uterine stem, to keep the uterine canal both patulous and straight. He gives the results of 80 cases so treated as follows:—

| | | |
|---|---|---|
| Dilatation for— | | |
| Dysmenorrhoea in virgins, all other means failing, | 57 | cases |
| Complete cure ,, ,, ,, | 53 | ,, |
| No better ,, ,, ,, | 3 | ,, |
| Made worse ,, ,, ,, | 1 | ,, |
| Dilatation in married women for dysmenorrhoea and sterility ... ... ... ... ... | 23 | ,, |
| Complete cure of dysmenorrhoea ... ... | 23 | ,, |
| Complete cure of sterility ... ... ... | 17 | ,, |
| Remaining sterile 2 years or more after operation | 6 | ,, |

Townsend gives the following table, showing the number of years that the patients had been sterile, and the time that elapsed between operation and conception. He gives no explanation of the fact that while he claims 17 cures of sterility out of 23 cases, the table gives particulars of 27 cases.

| Case. | No. years sterile. | Conception following Operation. | Age. | Dysmenorrhœa. |
|---|---|---|---|---|
| 1 | 2 years, 4 months. | 2 months. | 27 | Yes. |
| 2 | 3 ,, | 3 ,, | 24 | ,, |
| 3 | 3 ,, 2 ,, | 3 ,, | 24 | ,, |
| 4 | 3 ,, 3 ,, | 6 ,, | 27 | ,, |
| 5 | 3 ,, 3 ,, | 3 ,, | 26 | ,, |
| 6 | 3 ,, | 2 ,, | 25 | ,, |
| 7 | 3 ,, 8 ,, | 8 ,, | 29 | ,, |
| 8 | 4 ,, 1 ,, | 3 ,, | 31 | ,, |
| 9 | 4 ,, | 4 ,, | 33 | ,, |
| 10 | 4 ,, 6 ,, | 3 ,, | 29 | ,, |
| 11 | 4 ,, 8 ,, | 4 ,, | 25 | ,, |
| 12 | 4 ,, 9 ,, | 5 ,, | 27 | ,, |
| 13 | 5 ,, | 6 ,, | 27 | ,, |
| 14 | 5 ,, 6 ,, | 7 ,, | 30 | ,, |
| 15 | 5 ,, 8 ,, | 8 ,, | 32 | ,, |
| 16 | 5 ,, 9 ,, | 4 ,, | 31 | ,, |
| 17 | 6 ,, 7 ,, | 5 ,, | 29 | ,, |
| 18 | 6 ,, | 15 ,, | 28 | ,, |
| 19 | 6 ,, 1 ,, | 10 ,, | 29 | ,, |
| 20 | 6 ,, 3 ,, | 9 ,, | 27 | ,, |
| 21 | 6 ,, | 5 ,, | 26 | ,, |
| 22 | 7 ,, | 17 ,, | 38 | ,, |
| 23 | 7 ,, 1 ,, | 11 ,, | 30 | ,, |
| 24 | 7 ,, 3 ,, | 5 ,, | 32 | ,, |
| 25 | 7 ,, 10 ,, | 20 ,, | 29 | ,, |
| 26 | 8 ,, | 4 ,, | 31 | ,, |
| 27 | 9 ,, | 7 ,, | 35 | ,, |

In the treatment of stenosis of the external os when dilatation is difficult, it is sometimes recommended that the margins of the os should be incised with a knife or scissors. In my opinion this practice is harmful and need never be done; splitting of the cervix is precisely one of the things to be avoided if

we wish to give the patient the best chance of conceiving.

Nevertheless in former days the practice had a great vogue. In 1863 Greenhalgh (6) described a new "metrotome" which he had devised for the purpose. In his paper, which is of historical interest, he mentions that dilatation of the cervical canal by means of bougies was introduced as far back as 1823 by Dr. Mackintosh, of Edinburgh, who met with a good deal of success; of 20 cases treated, 18 were relieved of their dysmenorrhoea; of these 18, 10 were married women, of whom 7 afterwards fell with child. Greenhalgh attributes to Dr. Simpson, of Edinburgh, "the merit of having first, about the year 1844, divided the os and the cervix uteri with a *bistoire caché;* and such was the success of this and subsequent operations that many practitioners of eminence have since adopted his treatment."

### Injuries of the Genital Canal.

These have mainly to be considered in relation to secondary sterility, when the injuries have been brought about during labour.

*Lacerated cervix.*—This, especially when it is deep and bilateral, is quite definitely unfavourable to conception and to successful pregnancy, and therefore the tear should be repaired. The technique need not be described here as it is given in all textbooks of gynaecology.

*Ruptured perineum.*—This is not necessarily unfavourable to conception, but it becomes so when associated with marked prolapse and procidentia. It should then be repaired, and if necessary the operation can be combined with other procedures, as I shall describe when speaking of displacements.

*Acquired vaginal atresia and stenosis.*—We have seen that during parturition, and sometimes as the

result of accidents or operative procedures, the vaginal orifice may become narrowed and even almost obliterated by the process of cicatrization. The damage must be repaired by a plastic operation, the details of which will depend on the particular character of the lesion.

### Inflammation of the Genital Passages.

*Vaginitis, including gonorrhoeal vaginitis.* -For the treatment of this condition we depend mainly on douching; but the effect of douching is greatly assisted by swabbing out the vagina on several occasions, at intervals of 4 to 8 days, with a strong antiseptic, such as Lysol, 20 per cent., or nitrate of silver, 20 grains to the ounce. For this purpose, a Fergusson's speculum is introduced, the patient lying on her back with knees drawn up and separated. Some of the lotion is poured into the speculum, and with a swab of wool on a swabholder the vagina is thoroughly swabbed out, the speculum being gradually withdrawn to allow of the lower part of the vagina being reached by the fluid. The speculum is then re-introduced, and the vagina dried by means of a dry cotton-wool swab, in order that the strong antiseptic may not do harm by remaining too long in contact with the vaginal walls. Douching should be done at least twice a day, in the recumbent position: of the many possible lotions my preference is for a solution of biniodide of mercury 1 in 4,000, for the morning douche: and "Sanitas Sypol," 1 drachm to the pint, for the evening douche.

In acute cases, it is an advantage for the patient to be kept in bed for a few days. Alcoholic stimulants should be forbidden. The urethritis which so often accompanies a gonorrhoeal vaginitis needs no local treatment: it is best dealt with by copious drinking of milk and barley water, and the prescription of a

diuretic medicine, with the object of washing out the urethra from within outwards.

*Endometritis and erosion of the cervix.*—Erosion of the cervix may be present without endometritis, and in that case it is often sufficient to make applications of some chemical reagent; some of the most effectual are iodised phenol, liniment of iodine, and nitrate of silver, 40 grains to the ounce. The tenacious mucus which often covers an erosion should be cleared away before the application is made; and this is often done conveniently by swabbing the surface with peroxide of hydrogen, or with a mixture of equal parts of creasote, absolute alcohol, and glycerine.

When endometritis is present, with or without erosion, no treatment is likely to do much good short of dilatation and curetting, followed by the swabbing out of the uterine cavity with some antiseptic applied on a dressed probe. A strong preparation of iodine is to be recommended, such as Churchill's iodine, or the iodine liniment; and if a more thorough effect is desired, iodised phenol may be used.

Vaginal douching without curetting has very little effect on endometritis; but after the operation it is often an advantage to prescribe regular douching for 2 or 3 weeks, combined with the introduction of glycerine, or ichthyol and glycerine, tampons at night.

*Salpingitis, pelvic peritonitis and pelvic cellulitis.*—When inflammation has not gone as far as pus-formation, there are undoubtedly cases in which a course of local treatment will restore the pelvic organs to an apparently normal condition. I say "apparently," because the question of the patency or otherwise of the tubal ostia must remain a matter of speculation.

A course of local treatment should include primarily two or three weeks in bed. During this time glycerine and ichthyol tampons should be used. One

way is to introduce a tampon every night and remove it in the morning, hot douches being given night and morning. Another way which is very convenient, is to use the "pontampons" introduced by Morgan Richards, in the following manner. Supposing the treatment is to begin on a Monday, a douche is given Monday morning and Monday night, and after the latter douche a pontampon is introduced and left in until Wednesday morning. No douching is done on Tuesday. On Wednesday morning the plug is removed and a douche given: it is repeated Wednesday night and Thursday morning and night and then a second pontampon is introduced. Thus the patient wears a pontampon two nights and a day and is then without one two days and a night. The treatment is carried on for 3 or 4 weeks, but omitted while menstruation is going on.

Medicinal treatment may be given as required: it is often an advantage to give iodide of mercury three times a day.

When pelvic inflammation has gone on to pus-formation, operation is required: treatment has then for its object the restoration of the patient's health, and not the cure of sterility, which is usually in such cases inevitable and incurable.

A word may be said, however, on the subject of *conservative salpingostomy*. When the abdomen is opened and the tubes are found occluded but apparently not grossly diseased, an effort should be made to restore their patency. An incision is made at the occluded outer end, and the serous and mucous coats are oversewn all round with fine catgut, in something the same way as a button-hole is made. Even with this procedure the prognosis is not good: but it is at least not hopeless.

### Uterine Displacements.

Treatment of these conditions is of two kinds—palliative and curative.

*Palliative treatment* consists in the use of pessaries; I call it "palliative" because in the great majority of cases the displacement is corrected only as long as the pessary is worn; as soon as it is left out, the displacement returns. This feature is one of the great drawbacks of pessary treatment. A second drawback is the necessity of periodical visits of the patient to have the instrument removed and cleaned, and to see that no ulceration is being set up; and also the necessity for regular douching, in order to prevent discharges accumulating on the pessary and encrusting it. A third drawback, which is specially serious in the case of patients who are anxious to conceive, is that pessaries are nearly always irritating to the cervix and vaginal walls and lead to unhealthy discharges. As we have seen, such discharges are inimical to the vitality of spermatozoa, and are themselves responsible for sterility in a number of cases.

If there are definite reasons why palliative or pessary treatment should be adopted, at any rate as a temporary measure, the important points to be noted are these:—

*For prolapse and procidentia* a properly fitting rubber ring answers best It must be large enough to hold the parts up, and yet not so large as to cause injurious pressure or to interfere with the marital functions.

*For retroversion* a ring is useless, and some form of Hodge pessary must be employed. It should fit well, and should be made of some non-absorbent material such as vulcanite. It is all-important that the uterus be placed in its correct position, by digital

manipulation, or by the use of the sound, before the pessary is introduced. To put in a pessary while leaving the displacement unreduced is to add risk to inefficiency; the wearing of a pessary will never correct a backward displacement, though it will keep the uterus in place once the displacement is corrected. Moreover if a pessary be put in without first bringing the uterus forward the practitioner will find in many cases that he is attempting the hopeless task of treating by pessaries an adherent retroversion. Nothing but harm can result from this practice.

*Curative treatment.* I have spoken of the drawbacks of pessary treatment. Happily there is a more excellent way of dealing with displacements, namely by operation. Many operations have been devised for uterine displacements; the two best are hysteropexy and the intraperitoneal shortening of the round ligaments. Of these hysteropexy (sometimes described by the misleading name of "Ventrofixation") is the better, particularly because its results are lasting and because when it is properly carried out it does not in any way interfere with future pregnancy and labour. The important point in the technique is that the sutures should be passed through the anterior uterine wall as low as possible, above the bladder-reflection: by this means the fundus is left free to expand, and no fear need be entertained as to the fate of future pregnancies. I have at present something over 80 reports of uncomplicated pregnancy and labour following the performance of hysteropexy in my own cases.

Of the methods of intra-peritoneal shortening of the round ligaments I regard Gilliam's as the best; but from the point of view of subsequent pregnancy this method has the great disadvantage that it specially anchors the fundus low down on the abdominal wall.

*For retroversion* hysteropexy by itself is usually sufficient. Naturally any unsatisfactory condition of the uterine appendages that may be present is dealt with at the same time.

*For prolapse and procidentia* it is often necessary to do more than fix up the uterus; for the pelvic floor has become weakened, the vaginal walls are often relaxed and bulging, and in the case of procidentia the vaginal orifice has become unduly stretched, or the perineum may be markedly deficient. Hence it is often necessary to combine with the hysteropexy some plastic operation on the vaginal walls, such as anterior and posterior colporrhaphy and colpoperineorrhaphy. If at the same time there is a deep tear of the cervix, as we may find in women who have had one or two children, the uterus should be curetted and the cervix repaired. All these procedures can be done at one sitting; an experienced operator will complete the whole thing in 40 to 45 minutes.

*Pelvic tumours.*—These naturally require treatment for other reasons than for the cure of sterility; but there are cases where an operation can be done without destroying the hope of maternity.

*Ovarian tumours.*—In the case of large tumours, there is of course no alternative to the removal of the whole tumour and ovary; but in the case of a small ovarian cyst where there is a considerable portion of normal ovarian tissue left, the cystic portion can often be excised, and the cut edges of the ovary brought together by means of a continuous suture of fine silk or catgut. There is then still a chance that normal ovulation may take place.

*Uterine Fibroids.*—Some of these cases obviously demand hysterectomy; on the other hand, there are some cases of subperitoneal and even of interstitial and submucous fibroids where the tumour can

be enucleated, leaving a comparatively healthy uterus. There is an intermediate class of case in which a tumour or several tumours can be removed, but such a battered organ is left that its value for future pregnancy is more than doubtful. It is difficult to lay down general rules on this subject: it is best for the matter to be left to the judgment of an experienced surgeon.

## CONCLUSION.

In many cases the obvious or at least the apparent cause of sterility in women can be remedied, and the pelvic organs restored to such a condition as renders pregnancy probable. Nevertheless we must ever guard against making promises that the desired result will follow our treatment. We can but ensure that the conditions shall be favourable; and both remember ourselves, and point out to our patients that, in the words of the French proverb, "L'homme propose mais Dieu dispose."

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# GENERAL BIBLIOGRAPHY ON STERILITY

The subject of Sterility has inspired many medical writers; before the beginning of the seventeenth century references to it were mostly scattered about in treatises dealing with medical subjects in general; but in the course of the last three centuries many monographs and special articles have appeared. For the sake of those who wish to see what these writers, of many nationalities, have to say about the matter, I have compiled a bibliography, drawn from various sources; but I make no claim that the list is exhaustive or complete.

It has seemed to me that a bibliography is most useful when it presents the writings on a subject in chronological order, and I have therefore adopted this plan. To counteract the difficulty that results, of being unable to look up a particular writer in such a list, I have added an alphabetical list of names, with the year of publication, and by this means any individual reference can quickly be found.

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